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The Builder

ILLUSTRATIONS.

The New "Hôtel-Dieu," Paris (Plan, 10).—M. Diet, Architect 11
Principal Portal of Salamanca Cathedral, Spain 14, 15

CONTENTS.

Eighteen Hundred and Eighty 1
Considerations as to the Tay Bridge Calamity 3
On some Characteristics of Form displayed by the Elgin Marbles 4
Projected Excavations in Egypt 5
Chinese Labour 6
The Grosvenor Gallery 6
An Italian View of the Restoration of St. Mark's, Venice 8
The Use of a Museum 9
The New City Club Buildings 9
Architectural School, Royal Academy 9
New Hôtel-Dieu, Paris 9
Principal Portal of Salamanca Cathedral, Spain 9
Advice to Art Students: Gloucester School of Art 17
Competitive Farm Plans 18
The Sewerage Works for the Croydon Rural Sanitary Authority 18
The New Royalty Theatre, Glasgow 19
The Training of an Architect: Birmingham Architectural Association 19
Position of the Institution of Civil Engineers 20
The Goldsmiths' Company's New Buildings in Cheapside 20
Truth in Nature and Art 20
Tunis and its Lights 20
Christmas in Exeter 20
Proposed New Town-hall for Southwark 20
Walbeck Abbey: Architecture Underground 20
The New Bolton Infirmary 21
Competitions 21
Obituary 21
Saturday Afternoons at the Parkes Museum of Hygiene 21
A New Building Estate at Clapham 21
Auctioneers' Responsibilities: Townsend v. Etches 21
Cases under the Metropolitan Building Acts 21
Separate Dwellings v. Lodgings for Artisans and Labourers 22
Wood-carving in England 22
Shops for Training Apprentices 22
Fireproof Floors 22
Ornamental Materials 22
Epping Forest 22
Customs of Workmen 23
Absorbent Bricks 23
Architects' Duties 23
The Ventilation of Gas Burners 23
The New Haymarket Theatre 23
The Cost of Tendering 23
Rearing Water-Pipes 23
Life-Buoys 23
Copyright of Trade Catalogues: Chubb & Son v. Cotterell 24
Landlords' Liabilities: Cutler v. Mantell 24
Architects and Corporations 24
A Double-action Soil-pipe Ventilator 24
Church-Building News 24
Dissenting Church-Building News 25
School Building News 25
Stained Glass 25
Books: Pullan's Elementary Lectures on Christian Architecture (Stanford); Walford's Antiquary; Variorum 25
Miscellanea 25

1880.

THIS year we have, as we have had in some other New Years, to take note of thoughts which come uppermost to most of our minds, such as are little connected with art or architecture, and which would, if uttered, probably seem as little relevant to that subject as the well-known "explanation" in the farce,—"The thunder clouds that are now closing over the political horizon," &c. But although it is impossible, in times of political and social anxiety, that people should take the same interest in architecture as they do in times of prosperity and a bright future, when a stable and settled order of things seems to encourage men to build enduring homes for themselves and their posterity, it is not the less the duty of us all to carry on our special studies and efforts after improvement, so that when the clouds clear away and bright skies are seen again, it may be found that during the less hopeful hours something has nevertheless been accomplished which will be of value when the time comes to make use of it.

This is the light in which to look even upon purely artistic work, on which naturally no one can bestow much thought except in times of prosperity and security, when the mind is free for enjoyment. Hence we fear that this past year has been a bad one for artists, and that there is not very likely to be any immediate improvement in the activity of their market. For many, this means, it is to be feared, anxiety and difficulty on their own account, such as is not conducive to the production any more than to the enjoyment of art. For those who are more fortunately placed, and who can afford to wait over a time of "no demand," the wise and philosophical course certainly is to make such a season a time for laying the ground-work of new excellencies and new power, to be turned to happy account when the time of peace and order returns, and the interrupted work is resumed under happier auspices, and

"O'er the glad front the scaffold climbs anew."

But to ourselves there is less need of this self-exhortation, or mutual exhortation, against letting art fall to the ground between the conflicting political and social contentions of the day; for our business is not only with art and enjoyment, but with practical needs and requirements of life also. We have our own battles to fight too, against foes more insidious and more unresting than any of those with whom our armies have to contend. Whilst we read the newspaper records of the names of those wounded or killed in this or that encounter, let us not forget also the far larger but unpublished list of the numbers annually slain by bad drainage, bad ventilation, overcrowding, and other preventible evils arising from the conditions in which great part of our large towns are allowed to be left,—a kind of slaughter which is regarded with such remarkable equanimity, even by those whose very business it is to contend against it. When we read in the papers that a certain general and his small proportion of forces are cut off from their base and surrounded by the enemy in great numbers, we are all in a fever to hear that the necessary reinforcements have been sent, and to complain of the tardiness either of the operations themselves or of the communication of information in regard to them. But when at our own doors, in our own cities, whole closely-inhabited tracts are under the dominion of preventible mortality, from causes as deadly (though more secret in their operation) as the bullet and the bayonet, we are in no hurry to hear the details, or to send reinforcements to them, or to break up the camp of their besiegers; and those bodies whose official duty it is to do this sit with their hands folded for years, putting off their active operations to "a more convenient season," with none but a few ill-supported voices raised in remonstrance against such culpable and fatal neglect.

No doubt the issues of war are more sudden and immediate, and the loss of a battle that occupies a few hours' fighting, and kills a few hundred men, may have most serious effects for years to come upon the losers. The evil is concentrated in so small a space; is dependent for its increase or mitigation upon what seems almost a single cast of the die, openly made and visible to the on-looking world, that it is no wonder that the writers and readers of newspapers should feel a keen and intense interest in events that seem to concern so deeply the political power and even existence of nations, and which seem dependent upon such momentary turns of fortune, such mere lucky hits or unlucky mistakes in strategy. Yet there are forces at our own doors the movements of which are just as much fraught with important consequences to us, the movements of which few reporters chronicle, and still fewer readers care to hear of. The danger is not, or is not believed to be, imminent; and there is the secret of the apathy with which it is regarded. Were it known, for example, that a large proportion of London were undermined, and that the mine was likely to blow up in two or three days by slow match ignition, unless its exact position were discovered and the cause of danger removed, what a hubbub there would be among "bloodless officials" as well as among more sentimental and kind-hearted members of society, to get the people away to safe habitations, to get into the mine at all hazards and flood the powder, or do anything else that was necessary to ensure safety and to annihilate the scheme of the attacking party. But if it were understood that the match which was ultimately to ignite the charge was so slow that it might burn for years before producing its result, we may be pretty sure that apathy and procrastination would play their usual part, and that plenty of excuses would be found for putting off the trouble and expense of countermining, and leaving it to be considered by the next elected group of officials. When the explosion finally came, social historians would no doubt record that we were all madmen to have left so serious a matter so long unattended to, and that a people so indolent and weak deserved their fate.

Perhaps it would be rather different if it were really a sudden and instantaneous explosion that we had to fear. No one would like the chance of the fatal moment arriving in his lifetime. But when it is only an evil which, though sure in its advance if not attended to, can only be felt gradually and by slow degrees, the mere fact of its existence is forgotten except on rare occasions, when some one makes what others call a "fuss" about it, or when some death which can be traced directly to unsanitary conditions attracts the attention of newspapers and the public. These reminders being only occasional, it comes thus to pass that even after schemes for ameliorating this or that district have been drawn out, after property even has been purchased under the proper Parliamentary conditions, the work is allowed to stand idle out of mere apathy or red-tapism. We ought by this time to have seen the practical commencement, even the completion, of two or three rebuilding schemes under the Artisans' Dwelling Act; but they still hang fire, and the evils which the Act was intended to remedy are continuing unchecked, if not increasing. Let us hope that 1880 will not be allowed to pass before more active measures have been taken in these matters.

The matter of improved building, however, is not merely one of dealing with special sites in accordance with special legislation, nor is it entirely a matter of sanitation in the material sense. *Mens sana in corpore sano* is a proverb which not only sets forth in a concise way the conditions of the best and happiest form of existence, but tacitly implies a certain necessary connexion between the first and second of the conditions: *mens sana* is not only a happier and more useful mind when it is found *in corpore sano*, but it is a mind more likely to be found existing in such a habitation than in an unhealthy one. And in the same manner, if in a lesser degree, *mens sana in domo sano* may be said to be a union of conditions with the same relation in the nature of cause and effect. Of course, in the first instance, the *corpus sanum* obviously depends a great deal upon the *domus sanum*, and the latter, therefore, on that score indirectly influences the *mens*; but the influence is in some senses more direct than that. To condemn ill-built, wretched-looking, unhealthy houses, to provide well-built, healthy, and tolerably attractive ones, and to persuade people to occupy them, is a proceeding which has a much more direct effect on the moral and mental health of the occupants than is commonly recognised. To take one point only: what is the great source of overcrowding, and of a great deal of the want and helplessness which cries out to charitable institutions for relief, or is driven on the rates to seek it there? A very considerable if not the chief cause of this, is imprudence in marrying without proper resources. The very class who can least afford to be imprudent on such a score are those who marry earliest, and marry not merely imprudently, but recklessly. This is a question which has been often talked over by philanthropists in these days, and various schemes have been suggested for persuading and even for legally enforcing the delay of marriage until the parties wishing to marry could show that they had a reasonable prospect of keeping up a home without falling into beggary and misery for themselves and their offspring. The idea of compulsory legislation on the subject is probably quite impracticable, and would be attended by greater evils than it would cure. Yet, as a matter of fact, in the case of the well-to-do middle class of the country, imprudent marriages are rather the exception than the rule. And a very strongly operant reason for this certainly is that custom and self-respecting habits of life demand that a man should have a decent home to bring his wife to and to receive his and her friends in before he takes the responsible step of marriage. Among some of the more "fashionable" (shall we say?) ranks of society this is overdone, and (to adapt a little what Bacon said about death) the pomp of marriage becomes a more serious affair than the marriage itself. But amid the mass of the middle-class community the check to imprudent marriage and over-population lies really, to a great extent, in the pre-supposition of a decent, comfortable, and attractive home, in accordance, at least, with the resources and habits of good middle-class life. But where there are no habits (except bad ones), no self-respect, no decent homes, no opportunity for keeping up the decorum of life in any way, what check in the way of prudence and self-respect is there? If there is no such thing as comfort, health, or decency to be had, people think they may just as well make the best of it under the circumstances, and get what temporary happiness they can out of hasty marriage, and so go to swell the ranks of paupers and paupers' children. We verily believe that the introduction of a superior class of dwellings in our overcrowded districts, the cultivation of that self-respect in regard to mode of living which cannot exist in the houses in which many of our poor are housed, the new importance attached to the possession of a clean, respectable, and healthy home, which would lead it to be regarded among those classes (as it is among their richer brethren) a point of honour for a man to have a respectable home for a wife before taking one to himself,—that this influence would do more than any other one thing to lessen the evil of reckless marriage, and promise a smaller per-centage of paupers to the generation after next. The next generation, as well as our own, has, we fear, its burden cast upon it already.

To fight the battle of improved habitations is, therefore, a conflict which no one need be ashamed of being in earnest about, even at a time of great political and social difficulties which might seem at first sight to leave such a subject as architecture necessarily on one side. The battle, if not so calculated to draw the eyes of spectators, not so brilliant in its triumphs, or so instantaneously injurious in its defeats, is equally important for the national health and vitality, and may have social consequences much more lasting and far-reaching than we can see at present. And there is one advantage for the combatant in this contest which those in a military campaign often do not enjoy. He knows exactly what he has to fight against. What is bad and unhealthy in our town dwellings is mainly due to neglect of or improper dealing with natural physical laws; and these, inexorable as they are, are not variable or treacherous. They always work in the same way, and if we once know their ways we know them always. And we know a good deal about them now. What is wanted is not so much more knowledge as the vigorous application of what we already possess. To spur on those whose duty it is to apply the remedy should be one of our most important pieces of work for 1880.

We have fallen into an old strain. The *Builder* has sung this same song: in all sorts of metres, all manner of disguises, in tune and out of tune: during a whole generation and more. We need not say it has been done without any effect; it is our proudest boast that we have aided in obtaining the present comparatively general attention to the subject, and most assuredly the result of that attention will be our chief reward. But we have other songs to sing, other work to do beyond, though all connected more than might be thought at first sight with the provision of healthful homes. Art has to provide fit symbols of a nation's characteristics, a nation's intelligence, and a nation's glory; palaces for rulers, temples for religion; and while we attempt to teach, as heretofore, the beauty of Usefulness, we shall never cease to urge with reverent love the usefulness of the Beautiful.

CONSIDERATIONS AS TO THE TAY BRIDGE CALAMITY.

SINCE the breaking down of the girder bridge over the river Dee, at Chester, thirty-three years ago, no railway calamity has occurred in this country of so appalling a nature as that which took place at the bridge over the Tay, near Dundee, on the night of Sunday, the 28th of December, 1879. In magnitude, indeed, as well as, at present, in the circumstances of mystery and gloom in which the recent disaster is enveloped, the fall of the Dee viaduct is not to be compared to that of the Scottish structure. We were present at the inquest on the former occasion, and can never forget the intense excitement of those present in the court, an excitement which communicated itself in an unwonted manner, not only to the legal gentlemen concerned in the conduct of the case, but to the coroner, the magistrates, and the witnesses into the bargain. On that occasion, Major-General Pasley, one of the bravest officers who ever illustrated the distinguished corps for which he did so much, a man who made a plaything of death, trembled, turned pale, and became almost speechless under examination; so sorely did he feel the responsibility of having, some few months before, reported favourably as to the construction of the bridge. But the span of Dee Bridge was only 108 ft. The girders which crossed that river were each formed of cast iron, in three pieces, bolted together, and trussed by wrought-iron tension rods. The design was provided, under the sanction of Mr. Robert Stephenson, by an engineer who was unique in his power of dealing with figures, but whose want of that geometric sense which is nurtured and invigorated by an early acquaintance with Euclid was in this case unhappily illustrated. It was our opinion at the time, and one which has been rather confirmed than weakened by the reflections of a third of a century, that these truss rods were so disposed as to weaken, rather than to strengthen, the girders. The resistance to their strain was in the same direction as the resistance to the breaking weight. It came out on the evidence, with singular clearness, that the additional weight of a few inches thick of gravel which had been spread on the platform of the bridge, on the morning of the accident, had brought the insistent load so near the sustaining power of the bridge that the weight and jar of the first train that went over the loaded structure were fatal.

We refer to this celebrated investigation, not only from the natural association of memory, but in order to enforce the expression of the hope that the fullest and most searching investigation will be made in the present case; and that entirely apart from any personal animus. The last investigation as to the cause of a great and unexpected engineering calamity, that relating to the bursting of the gun on board the *Thunderer*, had a result which did not commend itself to the common sense of a large number of specially-educated men. We have been silent on the subject from the feeling that a certain degree of respect is due to the conclusion at which experts arrive in a formal inquiry, and from the idea that more conclusive evidence may have been laid before them than is reproduced in their report. But our hesitation has not only been shared by so high an authority as General Palliser, but the experiments conducted by that distinguished officer have gone far to establish the fact that the cause suggested for the bursting of the gun by the committee of inquiry was erroneously stated. We earnestly trust that no hesitation of this kind may attend the inquiry into the Tay Bridge catastrophe.

It is not anticipating the result of inquiry if we endeavour to point out some of the main lines on which, from our point of view of the case, the inquiry should run. It is of essential importance, not only to the cause of science, but to that of humanity, that we should be enabled, at whatever cost of time or trouble, to put a finger exactly on the cause of the catastrophe. This cause must have been one of three. Either the bridge must have yielded to the fury of the storm previous to the passage of the train. Or it must have yielded to the impact of the train aided, no doubt, by resistance of its surface to the tempest. Or, again, if partially displaced by the tempest, the access of the train must have completed the wreck of the bridge. It seems to us that these three cases exhaust the possibilities of the event.

It is admitted that the storm of the night attained unwonted fury. The first thing desirable here to ascertain is the exact direction of the wind. As to the nature of the gale, whether steady and continuous, or fitful and gusty, it may be difficult to collect the truth. But every effort should be made to procure, as far as possible, some graphic delineation of the movement and fury of the wind, as well as of that of the water beneath the bridge, at the time of the calamity. The exact time of the fall, of course, can be, at all events, approximately ascertained from the records of the last station at which the passage of the train was minuted.

As connected with this action of storm and tide, has to be noted the exact position in which the girders, or portions of the heavier work of the bridge, are found. With regard to lighter work,—carriages, platform, or the like,—the river or tidal action will probably have been the main cause of their displacement, after reaching the level of the water,—which level, we may add, should also be ascertained, as nearly as possible for the time of the transit of the train. But in looking at such masses of iron as a girder of 290 tons weight, the effect of the current on its position will be comparatively

small. The depth of water at the spot is, we believe, about 45 ft. at high water. The height of the platform of the bridge above high water is 88 ft. In case of a fracture under the weight of the train, the girder may be expected to be found very nearly under its original site. In case of an over-turning of the structure by the wind, a sensible movement to the leeward may be anticipated. High water at London Bridge on the 28th ult. was at 2h. 36m. p.m., and at 2h. 53m. a.m. on the morning of the 29th. The interval of time to Dundee, according to the almanack, is such as to be denoted by an addition of 34 minutes to the London Bridge time; the tide in the Thames being, of course, a different flow and ebb from that in the Tay. The tide rushes through the Pentland Frith with the extraordinary velocity of from ten to twelve statute miles per hour. The waves rush down the North Sea to join their effects at Sheerness; and when it is low water at Fraserburg, it is high water at Cromer. Again, low water at the Nore is coincident with high water at Cromer. The train which was destroyed was due, according to a telegraphic account from Dundee, at 7h. 14m. p.m. The gale is noted as having been in a south-westerly direction at Edinburgh. These data seem to point to a concurrent movement of both air and water, the tide being about 3 h. 45 m. of flow. As far as our own experience goes, the most furious gales on the mouths of our rivers are those that accompany and coincide with the rising tide. Thus both the fury of the storm above and the movement of the waters below may be expected to have had a tendency to throw the girders of the bridge either up or down the river, both while falling to the water and while sinking beneath its surface. Some calculations may even be hazarded as to the effect of the joint action of wind and tide, when the points which we thus indicate from general knowledge are verified by the observation of details. And we shall hardly be very rash in suggesting that should the girder be found, as was the Dee Bridge girder, beneath its proper position, the fact will point to the passage of the train as the efficient cause of the calamity; while, if it be found appreciably up or down the river, more weight will have to be attributed to the action of the storm or of the tide.

We are taking for granted,—and no doubt in so doing are only rendering common justice to the designers and constructors of the bridge,—that the idea of the breaking down of the girder under the sheer weight of the train, as an efficient cause, is one that may be at once dismissed from the mind. The structure is spoken of as remarkable for lightness and airy grace. But we have every confidence that neither the Scottish engineer nor the inspecting officer of the Board of Trade would have allowed themselves to make so close an approach to the margin of safety, as far as breaking weight was concerned. For our own part, we are, and always have been, opposed to anything like fine running in such a structure as a railway-bridge. We should even have admired the elegant structure of the Thames bridge by which the traffic of London and Southwark is led over the Thames at Westminster far more if it had been more substantial. To our mind the tremor felt on that bridge, although it may in no way be absolutely objectionable from structural reasons, would have been far better avoided, at the cost of a heavier and more substantial structure. But this by the way. This point will, no doubt, come to be thrashed out in the inquest, if any bodies are recovered on which the coroner or the corresponding authority in Scotland can sit. But we cannot anticipate that any oversight of this nature will then be found to have arisen.

It is, perhaps, otherwise with regard to another question of structure. In our railway bridges and other buildings we have been apt to give full and proper attention, especially since the Dee Bridge fracture, to the question of breaking load and its due margin. And in the Tay Bridge special attention was given to the difficulties opposed by the current, the tide, and the varying and sloping character of the bottom of the channel of the river to the construction of the foundations. We are less accustomed, in this country, to take account of the action of the wind. In our ancient cathedrals and abbey towers the substantial character of the stonework laughed to scorn the fury of the gale. In our domestic structures the case has been different. It is to the fury of a gale which occurred, if we remember rightly, in the November of the year 1705, and which overthrew many lofty chimneys, that the stunted form for so long a time given to those essential features of the dwelling-house, and the consequent hideousness of the railway approaches to London, where they pass between chimneys of every form of mean and ugly contortion, as well as of the common smoke nuisance of so many houses, are, we believe, mainly to be attributed. If we regard the wind as approaching a hurricane, we must remember that the present view of scientific men is, that the resistance of flat surfaces to the wind is, in the case of slow motion, as the square of the velocity, but gradually increasing more and more above that proportion as the velocity increases. The pressure of 55 lb. per square foot has been registered at the Glasgow Observatory. Professor Sir W. Airy is cited as an authority for the statement that, in this country, the wind may attain a pressure of as much as 80 lb. to the square foot. But contenting ourselves with the actually observed pressure, let us see how the case stands. The central girders of the Tay Bridge are 245 ft. long, and 27 ft. high. Were the girder solid, the force exerted on its surface, in a horizontal direction, if the wind were directly against it, at that pressure would be 162 tons. The girders are of lattice-work, which so far diminishes the surface exposed. On the other hand, the air escaping through the interstices of the windward lattice would strike with increased force against the leeward bars. Again, the resistance of the platform has to be borne in mind. That a horizontal force of 100 tons is by no means impossible to have been exerted against the bridge is thus tolerably certain. Let us look at the effect of such a force on the structure. It is an effect which, we should strongly be inclined to suspect, has not been fully anticipated in any calculation. The large mass of iron, on which it is possible that the gale may have taken all the firmer hold from the nature of its lattice texture, stands, as we take it, at a mean height of 101·5 ft. above high water. The piers are founded on cylinders of 31 ft. diameter, sunk to a good foundation, and filled up with concrete, on which hexagonal brick piers, 27 ft. by 16 ft. in dimensions, are carried up to high-water mark. Above this level the piers are formed of six iron columns of 18 and 15 in. diameter, made in 10 ft. lengths, bolted together, and fastened by strong diagonal and vertical braces. For any ordinary railway purpose this plan might prove amply strong. But how great is the leverage which is exerted by the wind! The extreme width of the base is, taking the published dimensions as accurate, 27 ft. The height of the neutral line of the girder (taking the tidal rise at 20 ft.) is 121·5 ft. above low-water level, giving a leverage of more than 4 to 1. A force of 100 tons on the girder face would thus have a wrenching power of 400 tons on the bolts of the lower columns. We do not, of course, say that this has not been fully provided for and foreseen. But we can say that the problem is one new to our own experience. It will, no doubt, be fully brought out in the inquiry how this is. Under any circumstances the problem is a very novel one. And, as in the case of the Dee Bridge, any professional man who took up the line of defence that the destroyed structure was erected in accordance with the best observed rules and formulæ relied on by the profession up to that moment, but that the event rendered necessary a reconsideration of these rules, would carry with him the full sympathy of every engineer, every architect, and every man of practical industry. Our object in bringing this out is not to throw on any one any hypothetical blame. Indeed it is quite the reverse. But what is more essential to decide than any personal question are the actual dynamical facts of the problem now so fatally solved. And it will be doing good service to the profession and to the world at large to bring all these facts into the fullest light.

Another point demands special inquiry. In the absence of a plan of the bridge we can only indicate it. Not only is there the steep gradient of one in seventy-three over the bridge itself,—an unfortunate arrangement, throwing much strain on the structure, and one to which we feel confident that Mr. Robert Stephenson would never have given his sanction,—but it is also mentioned in one of the accounts of the calamity that there is a curve over part of the viaduct. We do not pretend to offer any opinion as to the adequacy of the considerations that have induced the engineers to allow of so much extra strain being thrown on the structure, both vertically and horizontally, as might arise from the introduction of a gradient of one in seventy-three, and also of a curve, if any rapid rate of transit is maintained over the bridge. No doubt the reasons for the profile and plan adopted must have appeared to be very strong; for of such an arrangement, in so lofty and narrow a structure, it is difficult to speak in too condemnatory a measure in the abstract. For an edifice of the kind, exposed to such untried forces, 10,612 ft. in length, and of a height four or five fold its width, we should ourselves have sacrificed every consideration that interfered with the adoption of a level horizontal straight line for the axis. The cost of the bridge is extremely moderate. It is cited in the *Times* account of the catastrophe at 350,000*l*. This is only about 100*l*. per yard, or about half the cost per yard of the Mont Cenis tunnel. The Saltwood tunnel cost 118*l*. per yard; the Kilsby tunnel, one of the most difficult works on the London and Birmingham Railway, cost 145*l*. per yard; the Thames tunnel cost 1,137*l*. per yard. It would be interesting to know what additions to the cost of the Tay bridge would have been caused by the maintenance of the straight and level line. We are not without suspicion that it may have proved a very costly economy to depart from this primary rule of the railway bridge builder. Here also it will be important to know the running speed usually kept upon the bridge, as well as the weight upon the driving-wheels of the locomotive. In one of the last railway accidents in which we had the duty of making some observations, it was simply a question of some four or five miles an hour more or less speed whether the train would or would not have run off the line at the precise spot where it did unhappily do so. We have here a most important problem, of the balance between static resistance and dynamic force; and it is essential that no detail, however apparently small, should be omitted from the calculation.

We do not join in the remarks of those public writers who assume that the total wreck and loss of the train, deplorable as it is among the many fatal calamities of fatal 1879, will render impossible the proper ascertainment of the cause of the calamity. In fact, it is highly improbable that, were passengers or guards surviving, they could throw much light on the event. The driver and his fireman would, in all probability, have been the only persons who had even a momentary prevision of the wholesale catastrophe. The flash of light, of which several witnesses speak, was produced, we should conceive, by the projection of the red-hot contents of the firegrate on to the footboard, as the engine changed its line of motion. Whether the locomotive leaped into a yawning chasm, or broke its own way through the girders, the effect on the firebox would, as far as we can see, have been much the same. But we have full confidence that an exhaustive examination of the wreck of the bridge will tell the tale of the occurrence. And we are anxious that it should be as early as possible made plain that the exact position of the fragments of the bridge is a matter most important to ascertain before they are in any way moved. We do not question that the aid of photography will be here invoked. It is precisely one of those occasions on which this mute, impartial, unerring witness has the greatest value. It often happens that points, small in themselves, and of which the vital importance is only observed when it is too late to ascertain them, are neglected at the moment. It is for this reason that a photograph, which takes equal cognisance of all details, is of so much more value in throwing light on a calamity like the present, than a drawing or a report, which deals with the salient points, but which may happen to overlook some detail on which the whole analysis of the case ultimately proves to depend.

We must not trust ourselves to say anything of the terrible distress occasioned by this,—in this country,—unexampled catastrophe. We have addressed ourselves to the professional questions involved alone, and in so doing it is our hope that our words may not be without some effect in causing a more full and impartial investigation of every detail of the case, large and small, than might otherwise have been thought of under the full terror of the moment. When a calamity of this kind occurs, the first duty of the professional writer is so to utilise it as to prevent, if it may be, the possibility of a recurrence. And to those who think that a new uncertainty is imported over human life, and a new terror added to travelling, by the

terrible night of December 28th, we have to point to the long-enduring solidity of such structures as the Menai and the Conway Bridges, and to the existence of sixteen railway bridges of spans exceeding 300 ft., only adding, rather as an incidental than as a directly applicable remark, that to design too airy and too graceful a structure is one of the most dangerous temptations of the engineer or architect who builds in iron; and that economy in public works of the first magnitude, is false, especially in diminishing an extreme and almost an inordinate margin of safety when we are working under untried conditions.

The further details which have been published since the above was in type are strongly confirmatory of our view as to the points of least resistance afforded by the structure. Thirteen bays have been carried away,—the whole of those of 345 ft. span. At each end of the gap the lattice-work, the rails, and other pieces of continuous ironwork were twisted and torn. The whole of the ironwork was torn from the first pier that was destroyed; and even the stone coping on the brickwork of the substructure has been torn up. On the fourth pier, again, the columns were thrown down to the stone work. On the fifth pier, the coping was torn to pieces. The ninth pier showed great damage to the stone coping; and from the tenth pier the iron columns have been torn, with little or no damage to the masonry. Further examination will probably show very distinctly at what point in the 1,000 ft. gap the structure first yielded. The additional surface exposed by the train to the wind, which has been compared by a naval observer to the hoisting of a sail on a vessel, may have added just that degree of resistance which passed the margin of the holding-down power of the structure. But even as to that, we shall probably be able, by and by, to speak with more certitude.

ON SOME CHARACTERISTICS OF FORM DISPLAYED BY THE ELGIN MARBLES.

IF the visitor to the Elgin marbles, or rather the Parthenaic marbles, in the British Museum will look at the ribs of the left side of the mutilated semi-recumbent statue of the Herakles, some time called Theseus, he will see the marks of an iron bullet. A leaden one would but have splashed against the firm body of the Pentelic marble, and not have made the distinct splintered mark which is there to be noticed. The Turks, during their occupation of Athens at the end of the last century and at the beginning of the present one, not unfrequently used iron bullets, and one of their pastimes was to practise the accuracy of their weapons and their aim on the sculptures of the Parthenon and the statues of the divinities whom Mahommed had superseded. This evil habit of theirs, and the dilapidations which the grand sculptured works of this most excellent of the Greek temples was receiving from exposure, formed the justification to Lord Elgin for spiriting them away to this country. He did not, however, escape lashing for his spoliation, and Lord Byron himself did not spare him. But perhaps, after all that may be said, his bold act was a righteous one, in the cause of art at least. At any rate, had he left them where they were, amid the ruins of the Acropolis of Athens, there would have been nothing left to dispute about by this time. These noble fragments would have been but chips and morsels, or, at least, would have been so completely destroyed as to be of no value to any one.

Removed, however, as they have been now for many years, and having found a refuge and a resting-place in this remote island, of which the Greeks at the time the figures were worked probably did not know the existence, these ancient marbles, executed more than 400 years before the coming of our Lord, mutilated and defaced as they are, are regarded at the present day as among the most precious of our national art treasures. At once on their arrival in this country, at nearly the commencement of this century, they excited the greatest interest, and the esteem which they so promptly gained in the appreciation of the artist world has been on the increase ever since. Shortly after their arrival, the great Italian sculptor, the Chevalier Canova, who was on a visit to this country, wrote to Lord Elgin that the sight of these wonderful fragments would alone have fully repaid him for his visit to England. About this time, but previous to their purchase for the nation, experts of the highest authority were consulted before a committee appointed for the purpose, in respect to their merits and their value. Among those who gave their evidence and their opinions are to be seen the names of Nollekens, Payne Knight, Flaxman, Westmacott, and Chantrey, and although some admiration may be raised at the variety of their depositions, they at least, all of them with one accord, testified to the surpassing excellence of these mutilated and chance remains of the sculpture of the great Athenian period.

Nollekens, in his evidence before the committee above mentioned, in relation to their purchase for the nation, says of them that "the Theseus, which is now considered to be a Hercules, and the Neptune, are finer than anything in this country," and that "the frieze is of the first-class of art." And also although a considerable portion of the emolument this sculptor had received in the early part of his career,—and he was a great accumulator of money,—had arisen from the restoration of mutilated antique statues, he adds emphatically on this occasion and in reference to these works, he "would not have them touched." The classic, poetic, and highly-instructed John Flaxman follows with his estimation of them. "With respect," he says, "to the beauty of the relievos, they are as perfect nature as is possible to get into the compass of the marble in which they are executed." "There is one statue," he proceeds, "which is called a Herakles or a Theseus, which is of the first order of merit." "Also," in his opinion, he adds that "it is finer than the Torso Belvidere in the Vatican." In continuing his evidence, he speaks of the character of form which all these works taken together possess,—namely, the mutilated statues and fragments of heroic and colossal scale from the east and west pediments, the figures of the metopes, and the relievi of the friezes as representing "the finest nature in the highest state of exercise, and in the best condition in all respects, which might be expected from those who possessed great personal beauty and cultivated habits of living." This is a remarkable passage, even beyond its application to these great works from ancient Athens, as showing our erudite and refined sculptor's conviction that the mind informs even the contours of the body; and also asserting his view that habitual exercise developes high beauty in the human form as well as strength. In reply to the special question before the committee, he concludes his evidence with respect to the whole series of these remains by saying that he "considered it of the utmost importance to secure them for the country."

On the same occasion, Benjamin West, the veteran president of the Royal Academy, characterised them as being in the first class of grandeur, volunteering that he himself had benefited in his old age by studying and drawing from them. Sir Richard Westmacott follows with his evidence that the Theseus, *i. e.* the Herakles, is infinitely superior to the Apollo Belvidere (in which Flaxman, however, does not agree with him in so far as ideal beauty is concerned), that it is equal to the Laocoön, and, of its back in especial, that "it is the finest thing in the world." Chantrey considered the style of the Herakles "very much like that of the colossi on the Monte Cavallo attributed to Phidias, and that the Parthenaic works are finished to a high degree and yet calculated to be seen at a great distance." Rossi considered the Theseus and the river god, namely the Ilissus or Cephius, and the torso of Neptune, superior to the Apollo and the Laocoön. Sir Thomas Lawrence gave it as his opinion that the Torso Belvidere of the Vatican was the nearest of ancient works, in point of excellence, to the Theseus, to which Payne Knight agreed, only, however, by reversing their positions, as, while admiring the latter as an excellent work, he characterises it as not equal to the Torso Belvidere, which he considers a copy of the Hercules by Lysippus, although it has been usually attributed to Apollonius. The above is a mere sketch of the principal of the evidence given on the occasion, which, however, is well worth perusing in its entirety, and is to be found in Visconti's pamphlet, addressed to Lord Elgin, on the subject of the works which he had caused to be brought to this country, and to which his name is still popularly attached in our National Museum of Antiquities.

The few words just quoted of the evidence of these intellectual men and great artists afford ample token of the deep impression made on them by the contemplation of these mutilated marvels, and their favourable verdict has been more than confirmed by the judgment of subsequent years. How far, however, their excellencies are patent to the general observer it is difficult for an artist to decide. Instructed as his studies have rendered him in the human form,—given a portion of a statue he can work out and appreciate the rest, as it were by a mental rule of proportion, even more completely than Cuvier could, to whom, granted a bone, he would built up a skeleton, for the artist can go further than the skeleton, as he has flesh given him as well as bone in the fragment of a statue. It is very doubtful indeed whether the general public, devoid of special culture, can understand and drink in the beauties of these desolated statues; but they listen to their praises and take on faith the excellence of these remarkable works, which, however, are so natural and dignified in their ruins, in those portions which remain uninjured, that each successive visit would doubtless lay open,—even to the uninitiated, an increasing perception of their excellence, and help to create a sense of the beautiful in sculpture even where its germ was inanimate before. And in this inspiration for the noble and graceful which appears to arise from the contemplation of really fine works, even in an injured state, exists one of the great advantages which spring from the acquisition by a nation of such examples of the grand, sublime, and elevated in art.

A muse might weep over the havoc which has been made in these relics of past days by time and the iconoclast, but, perhaps, rather it is better to be thankful for what remains, and "to make the best of what is." For the purposes of study we must take them as they are, and compensate for their mutilation, not exactly by giving unrestricted scope to our imagination, but rather by building up intelligently, step by step, and fragment by fragment, the grand theory of human form which belonged to this period of art. Even in science imagination is necessary, and discovery is scarcely ever made altogether without it, but in this case, also, it must be imagination guided by reason, and examination and comparison. Thus may we fairly attempt to collect and collate the data we have, so as to touch at least, if not grasp, the grand scheme of human form adopted by Phidias and his school in that illustrious mythologic poem that arose in marble on the rock of Athens in honour of the goddess of intellect.

Far be it from us to assume this task. All we can do is to submit the observations which have occurred to us in the way of investigation. In this pursuit we are not, it may appear, quite restricted to the Parthenaic sculptures we possess in England, but may gain some illustrative advantage by consulting the finer of the two colossi on the Monte Cavallo in Rome, which is alleged, and with much apparent truth, to have been at least a close copy of a work of the school of Phidias, if not actually from that great master's hand. It is fortunate for our purpose that the attitude of this statue has much resemblance to that of a male upright figure in action in a metope in the Museum. This occurs in that one which is perhaps the finest of them all, and in which the hero, Theseus, as it has been suggested to be, is represented as controlling a Centaur, much as the figure on the Monte Cavallo is controlling a horse. The arms and legs in each case are spread out so as to display the full proportions of the body without interruption. The colossus is intact, or has been but partially restored, while the metope has lost its head, portions of each arm, and one leg is broken off below the knee. There are no hands, and the one foot remaining is damaged, and the toes are wanting. It is a wreck, doubtless, but it is one of great mark and interest, and very useful to the student of the principles and the history of sculpture, in the respect that there is an especial coincidence between the contours and theory of male form presented by these two ancient works of art. It must be confessed, however, that the metope appears to be somewhat the finest, but that may be attributed perhaps to its leaving so much to the imagination.

The so-called "Achilles" in Hyde Park is an ingenious adaptation, of the colossus of which we have been speaking, by the late Sir Richard Westmacott, erected in memory of the successes of our army in the great Continental

war with Napoleon, and of the great Duke of Wellington, whose residence was so near,—at Apsley House. Instead, however, of the bronze copy here retaining the occupation of the original, namely, that of controlling a horse, the reins in that case passing through both hands, the same action has been cleverly retained but for a different use and motive. The left arm and hand of the colossus in the park sustains a shield, and the right grasps a faulchion.

Whatever may be thought of the propriety of this adaptation, at any rate it affords us here in London an opportunity of comparing with the Parthenaic marbles in the British Museum a work apparently of the same period,—and of a style evincing much coincidence of theory of the human male form. It may have been noticed above in what that scientific and logical, as well as poetic artist, John Flaxman, says of the Parthenaic sculptures that "they represent the finest nature in the highest state of exercise, which might be expected from those who possessed great personal beauty and cultivated habits of living." Thus the artists of ancient Greece, from residing in a climate warmer than ours, which requires less clothing, and from the public exercise in athletic games of all classes of the people in the gymnasium, of which the very title indicates that it was a place of exercise for those at least partially nude, had greater advantages for the study of form in all its actions than the artists of northern regions who have to wrap themselves in thick, and frequently disguising costumes from the rigours of the climate. This every-day opportunity of beholding the human form before them in all varieties of action must have gone far to make up for the want of accurate knowledge of the constituents of the construction of the human body derived from actual anatomical dissection, from which the religious prejudices of their time and belief appear to have debarred them. It is true that while gazing upon the perfect development and surface of various of the ancient statues, instructed as we are at present in the form of bones, in the insertion of muscles, and in all those anatomical details which, if we have not personally gained by dissection, are the results of knowledge thus obtained by others, we can scarcely imagine how such truth could have been arrived at by mere surface observation without the above actual investigation; and we cannot but feel in degree humiliated by the consideration that we, with all our science and freedom of examination, have rarely come up to the perfection of the achievements of long-ago artists who were held in check by such restrictions. We must acknowledge indeed "there were giants in those days," and that they have recorded for us the forms of giants, not so much so that these are represented beyond the scale of life, although this is the case in the forms of their divinities and demi-gods, but that they were, to use a phrase of English, such "great men in small compass," the goal of human physical excellence being to exhibit the most powerful human creature within certain limits, with nothing wanting, nor, on the other hand, redundant or unnecessary, but all complete, vigorous, and compact. And this result, Spartan-like in training and fact, and Athenian in art, seems remarkably achieved in full perfection by the Parthenaic marbles. A cursory and superficial inspection of these is by no means equal to the occasion. The devotee of the principles of art should spend many an hour in the Elgin halls which contain these works, and lay his heart open to them before he can hope to fully imbibe their true spirit and realise the qualities of sculptural form of the age of which they are the storehouse.

Artistically, and in the light of science, fine form is inseparable from truth of structure, and investigation discovers and recognises certain special peculiarities of frame and proportion in these works which conduce directly to this economy of means and perfection of result, which may perhaps be well expressed in respect to male form by the above aphorism of the athlete, "the biggest man in the smallest compass." Were this a Greek maxim attributed to some classic sage, it might be thought more profound, but it could not be more true. As it is, however, it is dependable, and it may not be amiss to keep it in mind in investigating these great works of the Phidian school, in which we may find this homely adage perfectly worked out in conjunction with the noblest and most refined beauty.

We must break off for the present.

PROJECTED EXCAVATIONS IN EGYPT.

NOT long ago we had occasion to refer to a recent communication made to the French Academy of Belles Lettres, by the veteran Egyptologist, M. Mariette. As many of our readers interested in the history, life, and art of that distant and still far from fathomed civilisation, have followed in these pages, more or less succinctly, the progress of the knowledge which students yearly add to the patient inquiries of former Egyptologists, it will not be out of place to lay before such readers a summary of part of M. Mariette's communication relative to the new explorations shortly to be conducted by the French Government in Egypt.

The turbulent events of which the home of the Khedive has been recently the scene have exercised their natural effect on the excavations, and after a period of twenty years' activity, the works have been at a standstill for many months. The resumption of them is now approaching.

The obscure points which still impede and retard our advance in a knowledge of antique Egypt are numerous. Among these points, interesting as are the mythology, that mysterious book of the dead, the language, the literature, and the art, M. Mariette has, in his present communication, alone allowed himself to consider the history of the land of the Pharaohs. It is true, he observes, that for the study of the art and language of the ancient Egyptians, the resources afforded by our great museums are almost entirely sufficient; but this cannot be said to be the case with the history of the country and its people. New documents and new materials are absolutely wanted to enlighten the dim and confused acquaintance we at present possess of this side of the existence of the subjects of the Pharaohs. The gaps and missing links in this chain may be found and filled in in the course of the new excavations.

The knowledge we at present possess of the history of Egypt is but exceedingly vague. We possess Manethon, Eratosthenes, the tables of Abydos and of Saqquarah, the Hall of the Ancestors, the royal Papyrus of Turin; and we have at our disposition a thousand pieces of information scattered over the monuments we so far possess, and in the writers of antiquity. But this fact remains, that on these data it would be no difficult task to write several histories of Egypt, possessing in their respective enumeration of facts but a very small number of points in common. In every direction the same uncertainty meets the student; the whole division of the Egyptian kings into dynasties,—Memphite, Theban, Thinite, and Heracleopitan,—rests for foundation on the lists of Manethon; and at the same time, the facts do not concur with those of the famous papyrus at Turin, nor are we certain that such distinctions are conformable to the national traditions, or that the Egyptians themselves recognised them.

Another point is worthy of note. Manethon is at present our principal guide; but, at the same time, a passing tribute must be paid to the information given us by the inscriptions of the Serapeum (in the discovery of which M. Mariette, it will be remembered, played so important a part), those of Gebel-Barkal, and the cuneiform texts themselves. We now know of kings, and even of whole dynasties, unmentioned by Manethon. Here arises a whole series of doubts. To what reason must such an omission be attributed?

The doubt and uncertainty that beset the questions of detail in the history of Egypt are only increased when the student endeavours to reconstitute a history of national Egypt; the periods sadly differ in length and in exactitude. At the end of the so-called sixth dynasty, Egyptian civilisation reaches a sort of yawning gulph, in which it disappears, only to reappear 436 years later with the eleventh dynasty; and many other such instances will occur to the memory of the Egyptologist. How Egypt, which is so essentially a monumental and constructive country, can so completely forget its traditions as to allow of gaps of four centuries and a half, without the slightest stone appearing to enlighten us, is a mystery which remains to be cleared up.

Such doubts are not the only uncertainties which trouble the earnest student. The system of arrangement of the Egyptian monuments rests on but a very imperfectly settled basis. We are far, in fact, from having reached the truth, and, in spite of all the efforts made, it cannot yet be said that the framework of the history of Egypt is of sufficient strength or solidity.

How is such a state of things to be remedied? On this point one doubt is no longer possible, what must be sought above all things are the writings on papyrus.

The use of writing widely spread. Our museums contain some which touch on all the branches of literature, of history, religion, and private life; why should not others be found? The statement of Clement of Alexandria, that "all the wisdom of the ancient Egyptian philosophy was preserved in the forty-two sacred books attributed to Hermes," shows that these books have existed. Why, in some crypt, at the base of some statue, in some hiding-place in the walls of some temple, might not luck enable such documents to have been preserved? But where to find the papyrus? Necessarily, as is the case with the libraries and books of the present day, such writings must be scattered about; and good fortune can alone enable them to be found. The only skill which can be displayed is in the choice of the spot where an excavation or exploration can be conducted. Experience shows us that to attempt to seek elsewhere than at Memphis or Thebes would be lost time. Memphis and Thebes are where the new researches are to be made. As to the exact points, M. Mariette recommends, in the case of Thebes, the Assassif, to the circus of Deir-el-Bahari; the Coptic hills of Medinet-Abou, Deir-el-Medineh, and Cheikh-abd-el-Quornah. For Memphis, the only spot not invaded by the humidity is the Pastophorium and its environs. Here even luck can alone decide the day; but the limits of the hunting-ground being familiar the chances are increased. A fortunate blow with the pickaxe might place in our hands a papyrus on which might be built up an unshakable scaffolding for the reconstitution of the history of Egypt.

M. Mariette takes as a basis the division of that portion of our knowledge of this history with which we all are acquainted into the four great periods of the *Ancient Empire*, the *Middle Empire*, the *New Empire*, and the *Lower Empire*.

In considering the first of these, the *Ancient Empire*, the problem to be resolved is one connected with the very origin of Egyptian civilisation. How far back must we go to meet with a commencement? A civilisation has its stages, its cradle, its infancy. Where are the monuments which represent this period? Beyond the fourth dynasty at present all is doubt and uncertainty. There are those who believe that, in the remains in our national collections, in the statues of Sepa, at the Louvre, in the tombs of Khan-hotep, of Sokar-kha-ba-on of Tenta and others at Berlin, we have an art in its very commencement. But let it be remarked that the oldest monument yet known, the stepped pyramid of Saqquarah, of the so-called first dynasty, attests, by its careful construction, a civilisation not groping its way; while the temple of Armachis at Gyzeh, built with a skill which is surprising, affords equal matter for reflection. We must, consequently, go further back than these distant periods. The civilisation of Egypt, so old does it seem, resembles the Nile itself,—it hides its sources in regions as yet unexplored and unknown. Should the new explorations lead us further back than the point at which we have so far arrived a great problem will have been resolved, and at the extremest limits which the history of civilised man has at present attained we shall perceive the antique and venerable figure of her whom, more than ever, it would seem we have the right to call "the mother of all nations."

The explorations, which are to have for their principal object the origins of the Egyptian civilisation, should be, in M. Mariette's opinion, commenced on the three following points,—the great pyramids of Gyzeh, Saqquarah, and Thinis. The period anterior to the so-called fourth dynasty is represented in the minds of Egyptologists by two monuments on which it is important to fix our attention, — the great sphinx of Gyzeh, and the megalithic construction known as the "Temple of Armachis." It is not alone the Egyptologist who is familiar with the great sphinx of Gyzeh, it is known to every Biblical scholar. Pliny, mistaking the name of a god for that of a man, termed the sphinx the tomb of Armais. Since those days inscriptions have shown us that the sphinx was the gigantic image not of a King Armais, but of a god whom the hieroglyphs call Harmaku, god of the two horizons, and the Greeks Ἀρμαχις; it was also seen that the sphinx was, not a monument carved by the hand of man, but a

natural rock to which, by a few additions of sculpture and masonry, the exterior form of a sphinx had been given.

To most, the Temple of Armachis is equally well known. Built entirely, with the exception of a facing, in granite and in alabaster, it astonishes the traveller as much by its mass as by the choice of the materials used, and the simplicity and grandeur of its lines; the age of these two works is equally a matter of astonishment; the excavations and explorations commenced some years since, were not continued. It is these incomplete investigations which it is necessary should be continued. The limited space at our disposal, already so largely encroached on, forbids us entering further into the descriptions of this interesting object; suffice it to briefly summarise the progressive stages of its existence, how, after centuries of neglect, a tradition states that at the commencement of the New Empire, Thothmes IV., fatigued by a long journey, slumbered in the shadow of the huge monument; in a dream he was commanded to disengage the Sphinx of the sand which encumbered it. From this moment the aspect of the monument changed; more than one obelisk rose in its neighbourhood in memory of the devotion of successive monarchs. From this time we leap to that of the Romans. Again the sand of the desert has invaded the sacred inclosure, the huge obelisks have been moved and re-arranged between the fore paws of the animal. The temple had disappeared, and alone stood the smiling head of the sphinx, its immense breast and its stretched-out paws.* All the rest was sand.

What remains to be done is to completely disengage the sphinx of sand, and do what has been done for Ibsambool,—raise a wall round it to prevent the return of the sand. Then the sphinx will reappear, and with it the temple, in their primitive state. Once in this condition, the answer to the famous enigma which tradition states to have been once already answered, remains only a matter of time to see really solved the purpose of this mysterious monument and the date of the distant epoch at which it was erected.

In the second place, the necropolis of Saqquarah remains to be explored. We shall not be carried back so far as in the case of the temple of Armachis, but let it be remembered that at Saqquarah rises the pyramid of Ouenephres, which belongs to the first dynasty, and round this pyramid are grouped a number of tombs which, if studied with attention, could not fail to augment the small number of archaic monuments which we so far possess.

Descending towards the south, we reach the third point of exploration, Thinis, the birthplace of Menes, and the seat, according to Eusebius, of the two first dynasties. There is therefore a possibility that remains of the antique epochs of the Egyptian monarchy may be found. But where is Thinis? If we are to believe Stephen of Byzantium, Thinis is the antique name of Abydos; it is true the hieroglyphic form *tena* has been there found, but this is only poor evidence. M. Mariette believes that the city to which has succeeded in modern times the town of Girgeh, five or six miles from Abydos, is the site of Thinis. Opposite Girgeh, on the other side of the Nile and at the foot of the Arabic mountain, is a series of tombs dug in the rock, and belonging to some functionaries of Tena, attached to the worship of the god Anhour, the principal divinity of the name of which Thinis was the capital; this spot, unknown to travellers, is called Gebel-Yayah. M. Mariette was only able to consecrate, he tells us, some hours to the exploration of Gebel-Yayah, but the results obtained warrant a belief that further researches might bring forth some valuable mementoes of the contemporaries of the first and second dynasties. This being the case, Gebel-Yayah is placed on the programme of the excavations to be commenced.

Recapitulating, the first group of the so-called ancient empire, composed of the first, second, and third dynasties, will lead to the exploration of the great pyramids Saqquarah and Thinis. Without doubt the problem is difficult, and success will alone be obtained by means of efforts sustained for a lengthened period, but as an object to encourage the explorers, M. Mariette points out on the horizon the long-searched for antique figure of Menes, and the still more antique figure of the Hor-Schesu (the servitors of Horus), the founders of the national unity and of the most ancient monument of the sacred city of Denderah.

The second group of the ancient empire comprises the fourth, fifth, and sixth dynasties. It is the group of the *mastabas*. Here in the explorations, the work is only one of recapitulation. Many years' study has already been devoted to *mastabas* of the old empire, and the result of which may be found in the memoir of M. de Rougé on the "*Monuments que l'on peut attribuer aux six premières dynasties de Manéthon.*" But still much remains to be done. One has only to enter successively a tomb of the eighteenth dynasty and one of the fourth to be immediately struck with the difference which separates, in the matter of wall decoration, the funerary monuments of these two epochs. From the accession of the new empire (the eighteenth dynasty) the sombre "book of the dead" reigns supreme in the tombs. The defunct inhabits the infernal regions. Led by Osiris, his type and saviour, he combats the monster companions of the shades and of death. He is a *khou*, a luminous being, and he scarcely remembers that he was ever man. The *mastabas* of the ancient empire offer a very different aspect. We have still the "book of the dead," but of a composition little resembling that of the new empire. This time there are no monster companions, and Osiris does not even appear. The deceased inhabits a region which for every Egyptian of that time was an ideal of happiness. He fishes, hunts, and sows; he feeds his flocks; he has ensured by offerings while alive his daily sustenance. Remarkable fact, his servants and relations accompany him to these abodes of bliss. The pictures of the *mastabas* of the ancient empire show us uniformly the defunct transported into an ideal world common to all Egyptians. Up to this time, what we call an ideal world has been considered as a real world, and in the pictures which cover the walls of the chambers reserved to these *mastabas* we have seen the person to whom the tomb is reserved, not dead, but living, and the pictures sculptured on the walls show us his possessions. But whether the defunct be priest, soldier, agriculturist, courtier, or artisan, the scenes only vary in a few details. The Egypt of to-day resembles in a very small degree the Egypt of the ancient empire. There was then more marsh land, more reeds; the crocodile and the hippopotamus bathed in water-courses now exhausted, and which the simple plough of the fellah now turns up. But then, as still, the periodical inundation took place; then as now, Egypt became at a certain period of the year what Herodotus has described it,—a vast lake, from which the villages emerged like islands. It is easy to conceive an agricultural Egypt, difficult to imagine a pastoral Egypt. The *Phtahhotep* of Saqquarah pretends to have possessed 121,200 girls of Numidia, 111,200 ducks, 1,225 swans. Near him a certain Sabon reared in his vast domains 1,237 oxen of one race, 11,360 of another, and so on, a total of 15,360 oxen. It is impossible, therefore, that these tomb paintings of the ancient empire, on which such wealth is displayed, are pictures of real life. There remains, therefore, much to be done to clear away the mystery of this decorative art; other tombs must be explored; the pyramids Abousyr, Saqquarah, and Meydoum must be again visited; by this means we may be able to publish a book, till this time unknown, of the ancient literature of the Egyptians.

We cannot now pursue the subject further; but enough has been said to show that the proposed explorations would be in the right hands, and that successful results might be looked for.

* Such as we remember to have seen it represented in an exquisite sketch made fifty years ago by that most conscientious Egyptologist, the lamented Joseph Bonomi.

International Competition for the Construction of School Objects.—The Belgian "Ligue de l'Enseignement" prepares for the year 1880 an International Congress of Education, which will coincide with the jubilee festivities of national independence. The "Ligue" has decided to establish at the same time a competition for the construction of several objects of school material, which are difficult to be found in trade, or in which the lower schools are totally wanting. The objects must be at Brussels before the 1st of August, 1880. A jury will be named by the General Committee of the Congress. The selected objects will be experimented on during one year; a report will be made on the results of the essay. The premiated objects will be bought, and the authors of them will receive a bronze medal, and immense publicity.

CHINESE LABOUR.

THE various researches into the subject of labour, made in the valuable works of Mr. Thomas Brassey and others, still leave out of consideration a full third part of the human race. Many forms and phases of labour in many parts of the earth are introduced. In Europe, including England, France, Moldavia, Saxony, Bohemia, Austria, Belgium, Italy, and Spain. In the East,—Syria, Persia, and India. In the New World,—Canada, South America, and Australia. The various races of labourers are balanced one against another, and their comparative merits discussed. But the most numerous people of the earth,—a people who will doubtless some day make themselves known and respected as the most industrious, the most patient, and the most frugal of all,—have hitherto failed to attract the attention of writers on this subject. But is it to be wondered at that in any great question of universal interest the Chinese should be excluded, when they have for ages surrounded themselves with a barrier by their contempt for the rest of mankind, and while as a nation they show little desire to admit of progress or improvement? The Chinese having hitherto practically excluded themselves from consideration in the general question of labour, it is proposed in this paper to supplement the information already before the world by a comparison of the value of work done by Chinese in their own country with similar work executed in England. The claim of numbers, great as it is, is not the only one to be urged on behalf of the Chinese in favour of a fuller consideration of this subject; there is also that of experience. When our own forefathers were no better than savages, the same form of government, the same institutions, and the same opinions held sway in China; and while other nations have been otherthrown by revolutions China has held her own, unmindful, and till of late independent, of the fact whether outside nations existed or not. Many of the ordinary pedigrees of Chinese families can be traced with little difficulty beyond the Christian era, and there are few literary men who cannot trace their descent for at least 300 or 400 years. There are in China able and thoughtful foreigners who believe that the matured study of the Chinese system will reveal to us a panacea for half the social and political evils of life. This is nothing but a dream of pro-Chinese advocates. It is an exaggeration advanced to win favour as enthusiastic champions of those whom they imagine to be oppressed. The conclusion to be drawn will rather be that whereas much may be learned from such an experience as that of the Chinese, there is little to admire, and still less to imitate, in a system of government which, however noble in theory, is corrupted in practice almost to loathing.

But for all this, the *working classes* of the Chinese, be they traders, sailors, shopkeepers, builders, or field-labourers, are a people individually to command the respect and in some ways the admiration of the world. Physically strong, tall, square, well set-up men, capable of training to almost anything, the coolie class, and especially the Cantonese, know no Eastern superior. The loads they bear, the privations they stand, the indomitable endurance which they show under fatigue, cannot be too well spoken of.

As labourers, the Chinese need, as it were, to be introduced to the world, and to be permitted a fair and even place in the race of life. This they have never yet enjoyed.

To enter upon the "Chinese question" as connected with our Australian colonies, or with California, is to enter upon a subject in which the would-be advocates of the Chinese have hitherto been their greatest enemies. The best men among the Chinese never leave China. To live in quietness by their native streams, and to die in peace in their ancestral villages, is a positive virtue, enjoined by the sacred classics of China. "Wanderers" are cursed by tradition and by prejudice. To judge of the Chinese as a race one must judge of them in China. This fact is quite forgotten, and the Chinese emigrant, or rather "wanderer" often of the lowest class, palms himself off in foreign lands as a true representative of his great nation.

The erroneous impressions held in Western countries, and more particularly in America, respecting the natives of China, are most extraordinary. They may be briefly considered as represented under three heads.

(1.) Regarding the undeniable fact that many of the Chinese who go out of China are "bad,"

the main reason undoubtedly is because "wanderers" are cursed, and comparatively few respectable Chinese leave their homes. As to their wives, no Chinese woman of good fame leaves the home of her husband's family. She lives, not with him in his place of business, but with his parents in the family abode. Chinese wives are rarely to be found amongst the better classes, even in Hong-Kong. It would be destruction to the character of their family for them to be there. They never leave the husband's parents' side whilst these survive, or the family home when they die. They are visited by their lord and master; they join in the family duties; there they live and there they die.

(2.) Again, respecting the Chinese in China, and their desire to emigrate, it has been most wrongly said that they would like to go abroad, and cut off their queues, and bring their wives with them, if only they could acquire property and be protected. If this were a true statement of Chinese feeling, why do Chinese abroad preserve so carefully these badges, even where they adopt foreign clothing? To any one who has lived amongst the Chinese the idea of a Chinaman of respectability cutting off his tail is too absurd to need denial. A Chinaman believes that if he cuts off his queue in this world, he will appear without it in the next, and then what would his ancestors say to him?

(3.) Lastly, it is thought, in error, that the Chinese Government does not permit any Chinaman to be taken abroad unless he goes voluntarily, and that if he goes away in any other manner it is through English ports and not Chinese. On the contrary, the truth is that the very place avoided by the Coolie agents is Hong-Kong,—the only English port in China. The only Coolie ship of much importance loaded of late years was the *Perusia*, in the summer of 1878. She was prevented the use of Hong-Kong harbour by the prohibition of emigration to Honolulu. She took in Coolies therefore in the Canton river, in Chinese waters, where it was done in the face of the Chinese authorities. She was an English-owned steamer under the Belgian flag, consigned to American agents, and engaged by the Government of Peru. Whether these Coolies were free agents or not was a matter for the Chinese alone.

It is to erroneous statements such as the above that the Chinese owe their degraded position abroad. The hoodlums of San Francisco and the roughs of Melbourne will continue to have good cause to brand them as impostors so long as truthfulness regarding their antecedents is so wanting. But the qualities of those who stay at home are still untouched; they remain, to those who will judge them fairly, worthy of our careful study, our constant friendship, and, in some few points, of our imitation and praise.

But, turning to the more practical side of our subject, it is time we inquired, How will Chinamen bear comparison with others in the labour markets of the world? To commence with the lowest grade,—the common labourers:—

Excavation.

	Hong-Kong. s. d.	At Home. s. d.
1. Digging in common soil, throwing out, and removing 20 yards, up to 6 ft. deep, costs per cube yard ...	0 6	0 9½
2. The same class of work up to 10 ft. deep costs	0 7½	0 10½
3. Moving stuff over 20 yards and under 50 yards costs per yard	0 0½	0 1½
4. The cost of day labour is as follows:—		
Chinese women, 3 meals at 1d. and 3½d. wages, or ...	0 6½	0 0
Second-class labourers per day ...	0 7	3 4
First-class labourers „ ...	0 8	4 0

The conclusion arrived at as to unskilled labour in excavation is, therefore, as follows:—A coolie excavates a yard and a third in the time that a home navvy excavates more than five yards; so that the latter is equal to exactly 4½ Chinamen; the home navvy costing 4s. and the Chinamen 2s. 9d. for the same work performed. It must be borne in mind, however, that the Chinaman grubs up his load with a rough loose-headed hoe, or too often with a basin or with his hands. He fills, or half-fills two spoon-shaped baskets, which he slings with a bamboo across his shoulder and walks away in a kind of trot. The only supervision and training given is the daily visit of one hard-worked European, coupled with the goading of a native tally-taker. Many, however, can bear their testimony to what, with proper training, can be made of these men. Chinamen, with some little instruction, have been seen who could dig a well with a "throw" and a spirit worthy of a good navvy. To "pitch" a pot full of sand at one throw has been sometimes the means of most amusing exhibitions of Chinese skill. The fearlessness of some of these men in position of danger is often great, and the dogged perseverance with which, hour after hour, they scrape and carry, and carry and scrape, is, indeed, worthy of a better training.

The question of good living *versus* bad was never better illustrated than by Chinese coolies. The astonishing improvement which a few days even of regular meals of rice and cabbage (three times a day when at work and twice a day when weather prevents work) make in the physique and powers of a Chinaman is conspicuous. The well-known superiority of a private chair-bearer over a man called haphazard in the street is very marked, and this merely because the former gets regular food. Again and again may these former be heard to declare that so long as they have money "to buy wine" they can carry one anywhere, surmounting the highest hills. The condition, however, of the poor earth-coolies when ground down by sub-contractors, fed on bad red rice and putrid cabbage, and lodged in wretched sheds, is all the more obviously one in which improved circumstances of living bring a wonderful change in the amount of labour done. The stone-cutters of Southern China are men of great strength, merely because their hard work necessitates high living.

It will be interesting in connexion with this subject to describe the peculiar soil of Hong-Kong and the adjacent parts, and the following explanation of its nature by Mr. Price, F.G.S., Surveyor-General of the colony, is valuable.

"Hong-Kong stone is a highly felspathic granite, passing into syenitic granite (not syenite) in the north and western districts of the island, while in the central and south-eastern ones the formation is basaltic trap. In the Cape d'Aguilar Peninsula the trap shows dykes of basalt. Outcrops of trap occur in the granite districts, generally on the tops of the highest hills. The granite everywhere is much degraded, the carbonic acid of the atmosphere and rain has decomposed the felspar matrix of the rock, setting free the mica and quartz particles. The soil is thus generally found to be 'rotted felspar,' a silicate of alumina highly tinted with red oxides of iron."

This rotted felspar, of a reddish colour and gravelly touch, forms good building sand. Its weight is only 61 lb. per cubic foot, and the ordinary price per load 2s. 7½d., as compared with 124 lb. weight per cubic foot for ordinary pit sand at home, the cost of which is about 6s. 3d. per load.

Almost all the hills and islands forming the seaboard of South China are geologically of the above nature, their barren and rugged appearance presenting but an uninviting exterior.

The Chinese are fairly good lime-burners. Their ordinary material, however, is poor, nothing but coral being obtainable near the southern coasts, though good stone lime is to be purchased in Canton on order. The coral lime varies in quality and price, according to the weather. On the 22nd of March, 1879, after a dry season, the cost was 5s. 9½d. a yard in Hong-kong, the ordinary home price being about 13s. 6d. A cubic foot of this Chinese lime weighed about 39 lb., giving 57 ft. to the ton, as against 59 ft., which is the home average. It will thus be seen that with rotted felspar and coral lime, as a rule, but second-rate mortar is made in China. The use of pure sand is in most instances in Hong-kong impracticable in house-building, from the absence of means to prevent the introduction of salt-water sand, and good buildings are often to be seen spoiled by this error.

Another frequent source of trouble of this kind is the arrival from up-country of bricks and tiles saturated by salt water *en route*, which the Chinese take no trouble to prevent. The only way of surmounting the first-named difficulty has been by prohibiting the use of pure sand altogether, and substituting the rotted felspar.

Bricklayers' Work.

Chinese brickwork by ordinary custom contains 55 per cent. more mortar than English work, and but 81 per cent. as much of solid brick.

An English brick measures at least 8¾ in. by 4¼ in. by 2½ in. = to ·0511 cubic foot contents.

An ordinary Chinese brick is formed of blue clay, burnt at best in a heap, frequently only sun-dried. It is porous in the extreme, with little or no "ring," and usually very dead and earthy.

Bricks are the greatest trial found in building work in China. No foreigners being permitted to trade in the interior, access to the brickfields is to us an impossibility. It is true that a better class of kiln-burnt red bricks may be had on order, but at more than double the ordinary price, and not without considerable delay. The ordinary Chinese blue brick measures 9 in. by 3½ in. by 2½ in. = to ·0409 cubic foot contents.

There are, therefore, 1,710 Chinese bricks to 1,000 English, taken dry.

An English rod of brickwork of 306 cubic feet contains,—	
4,500 bricks, equal to	229·95 cubic feet
and mortar of 1½ yards lime to 3 yards sand	76·05 „
Total	306·00 „

A Chinese bricklayer provides his bricks as follows:—For 10 Chinese feet by 10 Chinese feet, half a brick thick, 650 bricks; for the same square one brick thick, 1,300; and so on.

English bond is the rule; Flemish bond is never seen in native work, and the unauthorised introduction of bats frequently destroys all bond whatever.

A Chinese foot is equal to 14¼ English inches. The cube in a Chinese square half a brick thick is, therefore, 43 English cubic feet. There are thus 15 Chinese bricks used to an English cubic foot, or 4,590 only to an English rod.

	cubic feet.
These 4,590 Chinese bricks fill	187·73
Leaving in a rod (according to custom) 2 33 yards of lime and 4·61 yards sand	118·27
Total	306·00

This large proportion of mortar is not always due to the inferior proportions of a Chinese brick, for in a 13½ in. wall it will be seen from their size that they nearly fit.

A comparison of the figures given in the calculations above shows Chinese brickwork to contain by custom 55 per cent. more mortar than English work, and but 81 per cent. as much solid brick.

The price of bricks is as follows:—

	Chinese.	English.
Per thousand	£0 14 2 = about	£1 14 0
Per rod, 4,590.....	3 5 0 = 4,500	7 13 0

The following table shows the comparison of a *rod* (306 cubic feet) of brick, English and Chinese:—

Brickwork.

CHINESE.

4,590 bricks at 14s. 2d.	£3	5 0
2½ yds. lime at 5s. 9½d.	0	13 6
4½ yds. sand at 2s. 7½d.	0	12 3
Labour of 12·85 bricklayers at 1s. 4½d. ..... 12·85 labourers at 8d.	1	6 3
Scaffolding at 4½d. per square	0	2 0½
	5	19 0½
Profit to a Chinese contractor, 5 per cent. minimum	0	5 11½
Total per rod	£6	5 0

ENGLISH.

4,500 bricks at 1*l.* 14*s.*	£7	13 0
1½ yds. lime at 13s. 6d.	1	0 3
3 yds. sand at 6s. 3d.	0	18 9
Labour of 7·97 bricklayers at 7s. 6d. ..... 7·97 labourers at 4s. 6d.	3	15 0
Scaffolding by rule	0	5 0
	12	12 0
Profit to an English contractor 15 per cent. gross	1	18 0
Total per rod	£14	10 0

English country work may, it is believed, be done in walls of flints in rural districts at 11s. 11d. per yard, or 6*l.* 15s. 1d. per rod. These flints, if mixed with bricks, raise the price of this kind of work up to 7*l.* 12s. per rod; so that even the very cheapest work of home production excels in price the ordinary Chinese brickwork.

Turning now to *day-work* prices for bricklaying, it is found that,—

	s.	d.
A bricklayer per day of 9½ hours, at home, receives	7	6
A bricklayer in China, working from sunrise to sunset, receives	1	4½
The labourer assisting receives at home, per day...	4	0
And in China but	0	8

The Chinese labour in a rod of brickwork costs 1*l.* 6s. 3d., or 12·85 bricklayers, with the same number of labourers.

The English labour in the same costs 2*l.* 15s., or 7·97 bricklayers' days' work, with corresponding labourers.

It follows, therefore, that 12·85 Chinese bricklayers are of equal capacity in labour to 7·97

English, or that one English bricklayer is worth 1·61 Chinese only, although he receives five times the pay. The value of Chinese brickwork, when built, cannot, however, of necessity be equal to that of English in quality. With blue porous bricks, and 55 per cent. more mortar, the result must be indifferent. The wonder is that it stands as it does, but age and a tropical sun improve it vastly as time goes on. The danger to all buildings in China is before the roofs are on. A sudden deluge, or even the outskirts of a typhoon, then destroys in a night the labour of months, but when once covered in and subjected to the extreme dryness of the cold weather in such a climate, this work turns out far more substantial than that formed of better materials elsewhere.

Chinese brickwork, of equal quality and durability to English, must be of the red kiln-burnt bricks mentioned above as obtainable, though scarce. These are fully 9 in. by 4½ in. by 3 in. in size, and cost about 1*l.* 10*s.* per thousand.

The comparative table of such work in a rod will be as follows:—

Chinese Red Brickwork per Rod.

	£	s.	d.
3,314 red bricks at 1*l.* 10*s.*	£4	19	5
1¼ yd. lime at 5*s.* 9½*d.*	0	8	8
3 yds. sand at 2*s.* 7½*d.*	0	7	10½
Labour as in ordinary Chinese work, viz., 12·85 bricklayers at 1*s.* 4½*d.* and 12·85 labourers at 8*d.*	1	6	3
Scaffolding, as before	0	2	0½
	7	4	3
Contractor's profit, 5 per cent. minimum	0	7	2
Total per rod	£7	11	5

This is but 21 per cent. over the cost of the ordinary blue brickwork, but it is impossible to obtain these red bricks at present in nearly sufficient quantities for general use. Could the brickfields only be managed by foreigners, or could we safely visit them with intentions of reform, a revolution in the class of work done would be the result; but the Chinese Treaty allows no such privileges to foreigners, and prevents us from owning any land in China beyond the confined and restricted limits of the Treaty ports. Turning once more to the workmen, we find they are undoubtedly worthy of better tools and materials. A Chinese bricklayer's trowel consists of a triangular scrap of rough iron about 5 in. across. With this he cuts the bricks, but he lays the mortar with a flat wooden shovel, and the bricks frequently with both hands. Such things as spirit levels are few and far between, even in the possession of contractors, and plummets of the roughest description are often almost as scarce. Nevertheless, Chinese buildings are by no means to be despised, and the better streets of Shanghai and Hong-Kong would do credit to many a European city.*

ROBERT GEROME ALFORD, C.E.

THE GROSVENOR GALLERY.

SIR COUTTS LINDSAY has provided a very pleasant exhibition for the delectation and improvement of his winter visitors, and we would emphasise the word "improvement," for a more instructive collection for the benefit of art students could not be found. The sketches and studies sent by some of our best artists inculcate before all things the necessity for work. Genius has been defined as the unlimited power of taking pains. We have never been able to accept the definition, knowing that the power of taking any amount of pains has often existed, and does exist, without any resultant evidence of what can be called genius. That great works are never done without the exercise of this power of taking pains we truly believe, and this should be fully understood by all students; unless they do understand it they will do nothing. For a practical exposition of this necessity they need go no further than the Grosvenor Gallery. In the east room, where the collection consists wholly of sketches and studies, will be found twenty-four contributions of that kind from Mr. Watts, twenty-six from Mr. W. B. Richmond, twenty-nine from Mr. Poynter, and thirty-four from Sir Frederick Leighton (not to mention others), and the observer will learn with what infinite pains and untiring industry pictures of mark are built up. We would point especially to the studies of the last named, the President of the Academy, as including specimens of the most exquisite workmanship. Take, for example (395), "Studies of Thistles and Teazles," and (408) "A Lemon-tree"; the skill and care exhibited are beyond praise.

We have here but given expression to the first thought inspired by looking into the rooms; we shall hereafter speak of the contents. We may note at once, however, that the Director has contributed a number of his designs and studies for the decoration of Dorchester House, Park-lane, the residence of his relative, Mr. R. S. Holford, a remarkable work executed *in situ* by Sir Coutts himself.

* To be continued.

AN ITALIAN VIEW OF THE RESTORATION OF ST. MARK'S, VENICE.

A PAMPHLET has been recently published in Venice under the title of "San Marco gl' Inglesi e Noi" * ("Saint Mark's: the English and Ourselves"), being a reprint of a series of articles in the *Veneto Cattolica*, a Venetian newspaper, which shows that public opinion in Italy is by no means unanimous in approving the works of restoration lately carried out at St. Mark's, and that although the majority of the Italian press have condemned the action of the English and French in protesting against any contemplated rebuilding of the west front, a respectable minority, composed mainly of those who from their acquaintance with art have a right to speak with some authority, have expressed their approval, and lament that the appeal had not been made in time to save those portions of the exterior which have already undergone the process of restoration.

The author traces the desire to rebuild the west front to the approbation with which the works executed to the north and south fronts were received by the press and the Italian public. "During the Austrian occupation," he states, "the large mosaics known as the Last Judgment were very nearly renewed from the designs of a school entirely foreign. There were, however, persons bold enough to oppose the Lieutenant-Governor, and who were enabled at last, when orders had been given to put up the scaffolding and to commence the work, to procure, through the intervention of the Cardinale Patriarca, a further period of suspension, which fortunately lasted until October, 1866, and this gave them the victory. But what was the course pursued by the majority of the artist academicians at that time? They not only approved of whatever pleased the Government, but carried their complacency so far as to throw doubt upon the good faith of those who had presented the tracings of the ancient mosaics found in the roof of the basilica; the want of which tracings, let it be understood, had given occasion to the ordering of new designs." He then proceeds to make a vigorous protest against any further alterations in the present aspect of the basilica. "Alter, if you will," he exclaims, "the ugly mosaic in the lunette over the principal doorway executed by Liborio Salandri from the designs of Querena (1836), put back the group of the vision of St. Mark which was removed when the above mosaic was restored, and, although preserved, has never been replaced; but alter nothing which was in existence at the time of the fall of the Republic." On this point he quotes a letter which was received with considerable favour at the time of its publication in 1864, when the question of the mosaics of the Last Judgment was under discussion, in which it was urged the mosaics should be put back in their places exactly as they were, "for the supreme reason that the Venetians as well as foreigners desire that future generations may look upon our St. Mark's as it was seen and enjoyed by the last of the Venetian doges." "Even if it were Titian himself," the writer continues, "who proposed to substitute new work for the old, the impertinence of the substitution would be signal: the rights of learning, of antiquity, and of truth would be sacrificed, and however beautiful of itself the work might be, it would not be the cynosure of those who wish to see St. Mark's as it was on the 12th of May, 1797."

As regards the west front, the author of the pamphlet goes on to say, "We know nothing as to what is to be done; we are informed, it is true, that there is a design which, it is said, involves radical alterations, and an expenditure † of several hundred thousand francs; that this design was submitted to the Commission for the Protection of Monuments, and who referred the matter for the consideration of a committee."

"We reason in this manner: if an individual finds his coat dirty or ragged he has it cleaned or repaired in order that he may not appear disreputable during the time a new one is being made. The same thing is done with regard to houses, and, in fact, everything which is made use of by private persons; but with respect to things which are used for public worship our practice is entirely different. These we allow to fall into ruin until the auspicious moment arrives, when (as was the case with the church of the Fenici) we build them up afresh."

This, it must be remarked, is not the opinion of a fanatical Englishman, but the calm and dispassionate criticism of an Italian, who cites instances to support his assertion of the indifference of his countrymen to the proper repair of their monuments, alluding more particularly to the church of the Frari, which has been seriously damaged by the percolation of water through the roof, which damage might have been at the outset arrested by a trifling outlay in repairs. He also points out that although four years have elapsed since the south side of St. Mark's was restored, the last semicircular pediment above the loggia has remained since that time despoiled of its principal covering of marble and of the crowning ornamentation, leaving the mosaic exposed to the infiltration of the rain, in consequence of which a large portion became detached from the soffit during the frost of last year and fell to the ground, leaving the brickwork bare. He also complains that scaffolding and shoring have been left which should have been removed, and that the work has been so carelessly looked after that the most precious marbles have been stained with mortar and cement, and in particular, the pavement of the baptistery is so thickly incrusted with cement that it will be difficult to remove the incrustation without damaging the pavement.

Combating the theory generally held in Italy, that it is permissible to replace with new work any ancient feature in the course of the restoration of a building, provided that the new work be an exact reproduction of the old, the author remarks that this principle is not true, even as regards plain masonry, and that in admitting it we forget the importance, conventional, perhaps, but not the less real, attaching to relics, and in fact to every object, in itself indifferent, which is linked to the memory of a dear friend, of a celebrated man, or of some important event or memorable era of history. The marbles of St. Mark, he continues, are precious, not only on account of their beauty and rarity, but because they belong to that grand monument of the Venetian Republic which is St. Mark's. This is attested by the anxiety of foreigners to possess themselves of some minute portion of the mosaics or of the pavement, which is one of the causes of its impending ruin.

Referring to the Ducal palace which has been lately restored under the superintendence of the Cavaliere Forcellini, the author imagines a learned English traveller, who has come to see the wonders of Venice, stopping before the large angle column and inquiring of his guide who was the sculptor of the capital. The guide replies "Gamba." The traveller appears surprised, but pulls out his note-book and puts down the name. He comes to the next and repeats his question, and the guide, mistaking his surprise for admiration of his knowledge, promptly replies "Zamola." The traveller raises his eyebrows, passes his hand over his forehead as if half asleep, and puts down the name together with those of Moretti, Girardi, Longo, and others.

"Our traveller, disgusted at not recognising these names among the Venetian artists of eminence known to him, rushes off to the library to consult the authorities there, and finds that Cicognara attributes the sculpture of the capitals to Calendario, Salvatico to Filippo and Bartommeo Bon, father and son, while other authors refer to this artist and that, but no mention is made of those indicated by the guide. He goes away in a rage and upbraids the guide as being either ignorant of his business or desirous of deceiving him, and listens with open mouth to the explanation of the enigma, which is that the original capitals have been removed and are preserved in the Correr Museum! This, however, is only the prologue of the comedy;

* S. Marco, gl' Inglesi e Noi. Estatto dal giornale il Veneto Cattolico, Anno xiii., Numeri 170—174. Venezia. 1879.

† The scheme for a complete restoration was promulgated in 1876, and the cost of the works remaining to be done was estimated at nearly three million lire, or 120,000*l.*

a few days after there is a long article in the *Times* and *Daily News*, and then there are fresh meetings, fresh protests, fresh controversy."

"And who is in the right? We," says the author of the pamphlet, "have not the presumption to set ourselves up as arbitrators in a question so serious and difficult. But we suspect that the English, skilled as they are in the arts of construction and mechanics, and conscious of the enormous progress that has been made in these arts, might come to us and say that, inasmuch as these capitals have a double office, that of supporting as well as adorning the building, it might have been possible to contrive that they should fulfil both of these conditions by making the core of some material of greater resistance than stone, and of the form necessary for stability, and adapting the antique sculpture to it. To this it might be objected that the capitals would no longer be the monoliths they were originally, and that they would lose their value as being cut from a single block of Istrian stone, but this is a matter of taste.

It may be said that the old capitals will be religiously preserved, but foreigners may be forgiven if they repeat the remark that was made with regard to the pieces of mosaic from St. Mark's, which were saved and worked up into a cornice, that they were intended to adorn a monument, and not to enrich a museum, and that there is a great difference between seeing them forming a part of the apotheosis of art in the Piazza San Marco, and viewing them separated from their proper surroundings in a miserable room."

From these extracts it will be seen that there are some persons in Italy who are not far from endorsing the principles of the most conservative in England with regard to the restoration of buildings. The pamphlet concludes with an exculpation of the Fabbriciera or Building Committee of St. Mark's, who are not, it would appear, solely responsible for the works which have been executed, the sum available for the sustenance of the structure being only about 2,000*l.* per annum, which is clearly inadequate for the repairs of so large and complex a building.

THE USE OF A MUSEUM.

A *conversazione* was held lately in the Warrington Art Gallery, when Mr. C. T. Gatty, of Liverpool, delivered an address. He said:—

I am going to occupy a few moments of your time with one suggestion upon what we may put into and get out of such a museum as you have here in Warrington. I say one suggestion, because as long as the world continues to be of its present magnitude, it would be impossible to deal with the whole subject in a long lifetime. My one suggestion is this, that as in the study of nature a comparison of forms and the causes of those forms teaches us natural history, so in the study of art a similar process will be attended with the same desirable results in art history. And to effect this comparison we must set alongside one another the art-productions of those nations whose history is well known to us. We must take such productions as the sculpture, coinage, or pottery of Greece at the different epochs of Greek history, and trace the influence of human thought and passion which are written upon them, as plainly as the footsteps of our antediluvian brethren are recorded upon the sandstone. Nor would such a case of comparative art-specimens cost you much money or be difficult to obtain. Electrotyper and photographer have put these things within the reach of us all, and, so far as such a purpose as I am speaking of goes, they would be almost equally as valuable as the originals. I will give you an example of what I mean. Supposing you had six photographs illustrating what I am going to speak of in Gothic architecture. You know that the beauty of Gothic architecture is its construction. The solid wall and expanded roof, supported by the open arch and slender column, this was the original spirit and excellence of Gothic architecture. Well, there came a day when this construction ceased to have its end in use, and become a meaningless affectation. It passed from being simply a means to an end, and became an end in itself. Buildings were designed which were nothing more or less than exhibitions of the architect's constructive ingenuity. But, mark you, this was not the case until those evil days when, as it is universally admitted, the elements of moral decay were at work amongst those who erected these buildings. These are the lessons that a museum may teach us concerning art-history, with half a dozen photographs. A museum is not alone the cabinet of the antiquary or the luxury of the wealthy and learned. It should be a temple of the Muses, and the home to which any man can turn to be inspired with a love of the arts. Some people seem to have an idea that a museum is the place in which all the forgotten, despised, cast-off *débris* of old furfurniture and ragtag and bobtail of pots and pans are to find their final resting-place, a sort of municipal auction-mart; but this is an unworthy estimate of the mission of a museum, and if you want to educate your people, if you want them to know the difference between the good and the bad, and the wise and the foolish in art, as well as in other matters, you must show them how to learn it. You must show by these examples that, as in literature there are the writers whose simplicity and nobility of purpose and manner are so catching that, as we say, "It does us good to read them," so in all forms of art there are the works wielding a beneficial influence or otherwise. If we create in ourselves a pure instinct, and set up in ourselves a high ideal, the entirely meaningless, foolish, untrue, and pernicious works with which we are every day brought into contract will cease to influence us, and we shall have as much distaste for them as we have for uncongenial society or unsavoury food. There is a notion in some people's minds that as long as a work of art is well executed it is very little matter what it is; but there is an old proverb that fine feathers do not make fine birds, and no amount of clever technical painting will save an entirely stupid or foolish subject from being foolish or stupid. These are the teachings of Mr. Ruskin, which he hopes to carry out in his museum at Sheffield, and I place my confidence in these teachings, because I believe that they will lead us to consider art as a means of education and improvement, and not only as a luxury. They will enable us to place before the poor, for whom such a museum as this is principally intended, the fundamental axiom that excellence in art results from a high state of mind and morality, and that this can be proved from a comparison of the art productions of any nation with its social and political history. Take as an instance the ornamentation that we find on Greek pottery. It begins with rude but vigorous efforts to delineate the gods and heroes, and the emblems of faith and nobility; and it ends with the degradation of these subjects when they become merged into a profusion of meaningless ornamentation. Or take, as another instance, the two ivory figures of St. John the Baptist in the Liverpool Museum noticed by Mr. Ruskin. The early Byzantine Christian figure, with the ascetic face and dress, holding a scroll upon which is the message of the Teacher who was more than a prophet, "Behold the Lamb of God, who taketh away the sins of the world"; and contrast with this intelligent, earnest representation of the ideal, the late fifteenth-century figure, supposed to be the work of Michelangelo, or at any rate of his school,—a writhing, headless, naked, athletically muscular figure,—showing that a day had come when the ideal of St. John was of a prophet without either head or message. These contrasts give us some idea of what we have to learn ourselves and teach to others, especially to the poor and uneducated, who look to a museum such as this for their art-lessons, and for whose right guidance in such matters those who have a knowledge of the truth are to a great extent responsible.

THE NEW CITY CLUB BUILDINGS.

IT is a noticeable and suggestive circumstance that within the last few months several of the large palatial buildings in the City (many of them only recently erected) have been offered for public sale, "by order of the mortgagees." Last week the New City Club, situated in George-yard, between Lombard-street and Cornhill, was offered for sale at the Mart, Tokenhouse-yard, under these conditions. The property is partly freehold and partly leasehold, the entire premises occupying an area of 4,430 superficial feet, and they are so constructed with internal party walls as to admit of subdivision into three portions. 46,000*l.* was offered, and there being no further advance the property was withdrawn.

ARCHITECTURAL SCHOOL, ROYAL ACADEMY.

ADMISSIONS, DECEMBER 31ST, 1879.

Upper School.—E. W. Coldwell, F. Miller.

Lower School.—F. C. Booty, W. Bucknall, J. H. Curry, B. Dicksee, G. Frisch, J. C. Hambling, E. G. Hardy, D. S. Haynes, W. Lane, C. J. Marshall, J. W. Simpson, E. A. Woodrow.

Probationers.—A. M. Calderon, C. J. Fagg, J. B. Gass, A. Keen, W. F. Keen, W. R. Lethaby, E. A. Ram, B. A. Raves, F. W. Richardson, E. W. Smith, J. D. Wheeler, C. C. Wilson.

NEW HÔTEL-DIEU, PARIS.

IN illustration of observations on hospital construction recently and previously given in our pages, we publish in our present number a view and plan of the great building of that kind recently opened in Paris. It stands, as all recollect who have visited Paris, on the island formed by two arms of the Seine, and known as La Cité; in close company with the Palais de Justice and the cathedral of Notre Dame, taking the place of the ancient hospital which preceded it.

As long ago as 1867 plans for a new Hôtel-Dieu were submitted to the late Emperor Napoleon III., but these, not meeting with his approbation, were abandoned, and the present edifice was decided upon.

The hospital consists of two blocks of buildings (with six pavilions) united at the extremities by the chapel. In the centre is the Cour d'Honneur.

Each block contains ten wards. Those on one side for males, the others for females. The largest wards each contain twenty-four beds; the remainder from one to six; the total number of beds being 530, viz.,—282 for men and 248 for women. Covered galleries, with polished oak floors, serving as a promenade for the patients, look out upon the courtyard, and an open terrace on the top of the building serves the same purpose. Eight *ascenseurs* or lifts serve to carry the patients to the wards, in each of which there is a telegraphic apparatus communicating with the surgery and the offices of the administration. The hospital is warmed by hot air, which, entering through gratings in the floor, passes out through holes in the ceiling; these holes serve in other ways the purpose of ventilation. Four powerful machines are employed for the heating process. Each ward has its loft, where bedding, &c., for changes in case of emergency are kept. On the men's side, as on the women's, there are six saloons,—three on each story,—provided with couches and chairs, on which the patients can recline and while away the time by reading, writing, or working. From the lower saloons a flight of steps leads into an artistically-arranged garden, also for the use of the patients. We may here mention that there is an ophthalmic ward in the hospital. The medical staff consists of two professors, six physicians, and three surgeons. There are consultations every day. The surgery, magazines, and kitchen (where everything is cooked by steam), are on the ground-floor; as are also the baths, but one of these is kept in each ward for very sick patients.

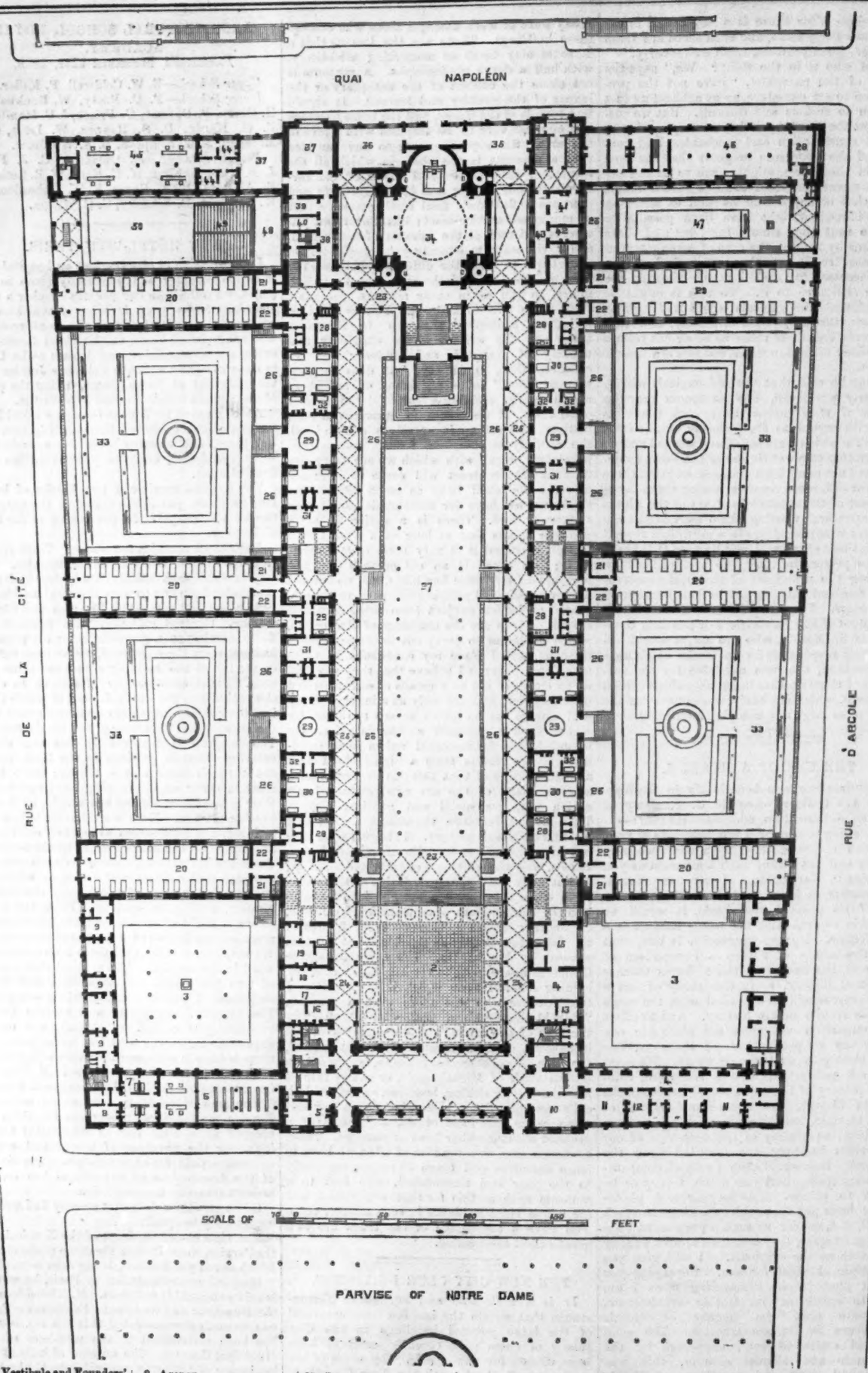
The architect of the edifice is M. Diet, and its constructors are MM. Dallemagne & Voirin.

The new Hôtel-Dieu, commenced under the Empire, and finished under the Republic, was erected at a total cost of 40,000,000 francs, including the purchase of the ground and indemnities paid for expropriation. The sinking of the foundations of the chapel has for the present retarded its completion.

Of its merits or demerits we may find another opportunity to speak.

The view shows the front of the Hospital next the Parvise, Notre Dame; the dome of the chapel, which is not yet finished, being seen beyond.

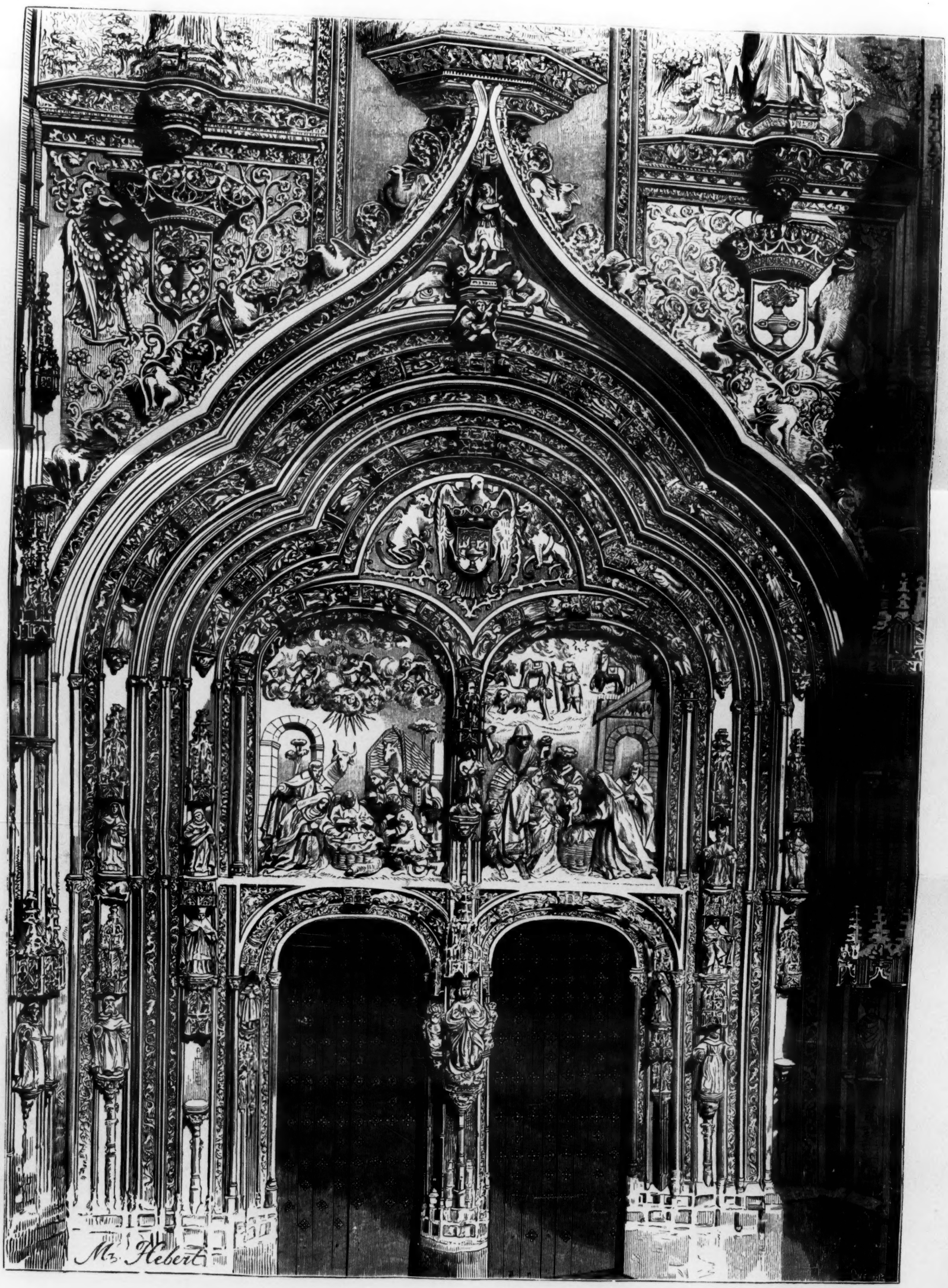
Hospital accommodation in Paris, let us add, is said to be still insufficient. M. Michel Moring, the Directeur de l'Assistance Publique de Paris, has recently demonstrated this in a report that has been distributed to the members of the Municipal Council. The number of beds at the beginning of 1879 was, according to the budget, 4,272. The average number of beds required is 4,615. The insufficiency is made up by 300 or 400 stretchers placed in the wards, to the great detriment of the hygiène of the wards and the health of the sick. Yet in spite of this abnormal extension given to the means of action of which the Assistance Publique disposes, the central bureau of admission to the hospitals has been obliged to send away daily sixty or eighty sick for want of room.



1. Vestibule and Founders' Hall.
2. Entrance-court.
3. Servants' hall.
4. Corridor.
5. Concierge.
6. Waiting-room for out-patients.
7. Boarders' rooms.
8. Agency.
9. Workshop.
10. Waiting-room for visitors.
11. Workmen.
12. Directors.
13. Box-room.
14. Provisions.
15. Ditto.
16. Pupils.
17. Passage.
18. Cloak-room.
19. Drugs.
20. Ward for 24 beds.
21. Sister.
22. Bath.
23. Gallery of communication.
24. Gallery.
25. Corridor.
26. Yard.
27. Court.
28. Office.
29. Day-room.
30. Ward for six beds.
31. Ward for two beds.
32. Ward for one bed.
33. Walk.
34. Chapel.
35. Work-room.
36. Funeral chapel.
37. Mortuary.
38. Funeral passage.
39. Sacristy.
40. Bureau.
41. Parlour.
42. Service-room.
43. Entrance for the Community.
44. Professors' rooms.
45. Dissecting-room.
46. The Community.
47. Garden of the Community.
48. Machinery-court.
49. Fuel.
50. Yard for fuel.

THE NEW "HÔTEL-DIEU," PARIS.—*Plan.*

THE NEW "HÔTEL-DIEU," PARIS.—M. DIET, ARCHITECT.



PRINCIPAL PORTAL OF SALAMANCA CATHEDRAL, SPAIN.

PRINCIPAL PORTAL OF SALAMANCA CATHEDRAL, SPAIN.

WE present in this number of our journal an illustration which faithfully represents the principal portal of the cathedral at Salamanca, one of the most notable artistic monuments of that remarkable city, which well merits the title sometimes given to it by Spaniards, "*Roma la Chica*" (Little Rome).

This cathedral, commenced in 1513, was designed by Gil de Hontanon, and the work was carried on after his death, which took place in 1577, by his son Rodrigo. Although in all respects a Gothic building, some of the details suggest the approach of the Renaissance, which in other countries was already in full swing. Mr. Fergusson, in his admirable History of the Modern Styles of Architecture, mentions that this cathedral was so much admired that Gil de Hontanon and his son were selected as the architects of the cathedral of Segovia, one of the largest and finest in all Spain.

ADVICE TO ART STUDENTS.

GLOUCESTER SCHOOL OF ART.

THE annual distribution of the prizes awarded by the South Kensington authorities and by the local committee to the students of this school took place on the 22nd ult., Mr. Gambier Parry, president, in the chair. The report of the committee stated that,—

During the year ending last Midsummer 209 students attended the various classes, showing a decrease of 20 as compared with the previous year. Five hundred and twenty works in various stages by 79 students were sent to South Kensington for examination last April. To these the Examiners awarded twelve third-grade prizes among eleven students, twice the number obtained the preceding year, but one has been disallowed, as the student had obtained a higher success in the same stage previously. The new rules of South Kensington do not allow a student to obtain for the same stage of study a similar or lower grade of prize to that previously obtained by the same student. Seventeen works by ten students were retained for the national competition. A national bronze medal was awarded to Miss Mary Garland for a painting from the figure cast, and two national book prizes were awarded, one to Alfred Calton for a design for a frieze, and one to William Joseph Whiley for a set of drawings of the five orders of architecture. In the second-grade examinations seventy-nine candidates were examined, of whom forty-nine were successful; of these, nineteen students obtained twenty-two prizes, being three more successful students and six more prizes than last year.

Mr. Gambier Parry having distributed the prizes, proceeded to deliver an address, in the course of which he said,—Our School of Art is designed for the benefit of three distinctly different courses of life, viz., that of the artisan, the amateur, and the artist. It would be to the advantage of the first of these if he realised, and, after doing so, if he cared for the sort of profit to be got from such a school. Everything is profit or loss to him. The trade view of life is right when it regards nothing so good for a beginner as apprenticeship and tough experience. That view is altogether right; the only question is, what is the best sort of apprenticeship, and what is the shortest road to experience? One thing appears to me very certain in all such matters as relate to the artisan, viz., that if the principles of trade unions are to dominate the country, all good work must be squeezed out of the artisans by that fundamental rule of which it is scarcely an exaggeration to say, that in each distinct department of every trade it measures and restrains the work and value of the best and ablest man by the calibre of the worst and weakest, destroying all interest in the work itself, cutting all heart out of a man's life by restrictions not only on his hands but on his gains, scattering to contempt all thought of conscientious reward, and cutting at the very root of all moral excellence in industry, energy, or perseverance. If there be any institution based on principles and actuated by motives for results the very opposite of all those, it is an art-school. Its leading purpose is to engage both heart and mind in every branch of work, to help and encourage the weak, and give direction to the strong. It teaches to all the reasons for what they do; it lightens labour by the interest thus thrown into and around it, and it brightens all drudgery by intelligence. But all this is only to be got by work. An art-school is no mere place for amusement. All the success to which it can lead depends on courageous perseverance. What is it that an artisan most requires but that knowledge and experience which make him master of his trade? But on what do this knowledge and experience depend but the training of the faculties of head and hand? This art school affords this training. Its one great ultimate end and object is that training. As institutions aided by Government grants, or, in other words, supported in their degree by public taxation, they would have no excuse for their existence but upon the grounds of their educational power and value to all classes of the population. If artisans would freely avail themselves of all they could learn here, their ultimate profit would be great. It may be that a man would be set to some work here that would seem to him to have little or nothing to do with the trade he intended to pursue. Our difficulty here, as elsewhere, is to make people understand the meaning of education. It seems most natural to make all teaching special; but experience has long since proved that just as to know any one thing perfectly a man must first know a great many other things well, so it is with all mannal labour; any perfect work, no matter of what sort it be, is simply and in truth the focus on which a wide and laborious education has been concentrated. No work, even the most mechanical, has much value unless it has a certain amount of brains mixed up with it. The child of the commonest labourer gets his money's worth out of his parish school by the increased intelligence he is enabled to bring to bear on the labour for which he is paid. It is the skilled artisan, or the pupil who is to be one, for which our art-schools are designed. He will get his money's worth by his work here. For what is the effect of the training in the first principles of delineation but that of clearing off all mental cobwebs by the practice of observation? No one can delineate anything that he does not understand. What is all bad drawing but simply a want of understanding what is drawn? Your mind must first analyse the component parts or qualities of any subject before you can delineate it. If, then, any one goes seriously to work to do so, I beg you to realise what a step in his education he has made. His perception is so far cleared, because his eye has been trained to analyse, and his handiwork is all the firmer by the increased firmness of his brains. Such is the theory on which the education of a skilled artisan is based. And if a man will only have the confidence and the industry to bear the discipline to which he would be called on to submit in the classes of geometry, perspective, and construction, and then pursue those subjects to their ultimate object, viz., that clear comprehension on which the correct representation of all objects depends, he will have laid a most certain foundation of success in any trade or business where steady thought, trained eye, and skilled hand would earn his honourable livelihood. I have said that the school was for three classes—the artisan, the amateur, and the artist. I have said something about the artisan, so we will turn to the amateur; and I confess that in talking of an amateur I have a very considerable difficulty, because it is extremely difficult to make a definition of an amateur. In the first place, you may say there are two kinds, one properly the amateur and the other the *dilettante*. Now a *dilettante* is an excessively pleasant sort of fellow, who is uncommonly charmed with everything; a sort of cosmopolitan individual, who is always full of pleasant talk, who knows a little of everything, just enough to keep his head above water; indeed, he is a very pleasant, but very often an extremely ignorant fellow. The amateur is different, for he does not only pass on the surface of things happily as the *dilettante* did, but he is a real lover of what he does, and, therefore, he devotes himself in a certain degree to it. A bird without feathers is still a bird, and an amateur is like a half-fledged bird; you do not know how to classify him, but still he often knows as much or more upon artistic subjects than his Royal Academician friend in some particular branch; but in matters of execution he fails in comparison, for the best of reasons that the professional is always in and the amateur has the disadvantage of being always out of practice. But I think this ought to be said with regard to an amateur,—that there are positions of a very high character which he is most fit to fill. I do not know how far, if I had the Royal Academician by me, he would be angry with me; but I must say when we look to the arts of England by the establishment of the Slade professorships, and we see men appointed to these offices in the Universities, that we should hail with very great satisfaction the appointment of a great accomplished Royal Academician. We should be perfectly sure he would be worthy of his place, and he would be most valuable in it to all who would attend his lectures. But I must say that I should, and numbers who have thought on this matter would also, regret to see the Slade professorships restricted to Royal Academicians, or to men highly advanced in professional art. I think it would be a very great help to many pupils if occasionally a distinguished amateur were made a Slade professor,—a man of great accomplishments, study, experience, and judgment. An amateur of that kind, with the freshness and freedom which he would carry with him, would be very likely to find avenues to the sympathies of many pupils, and touch chords in their hearts which would raise a music in their souls which, very likely, the more restrictive, cautious, careful, skilled learning of the Royal Academician might fail to produce. Coming to the artist, I shall be excused if I say but little. Fortunately I do not speak to professional artists, but to pupils who possibly intend to be professional artists. I beg and entreat you to give the utmost diligence to those tiresome things which, in school training, little children call pothooks and hangers, and which with you are construction, perspective, geometry, and all those tiresome problems you are called to exercise your minds upon by unravelling and understanding them. You know that in speaking any foreign language, if you know it well you do not think of the genders, accusative cases, plurals, and all those things, which come quite natural to you. And it is exactly the same with art. A sketcher ought to know exactly the position of his paint-pots,—where are his transparent and where are his opaque colours, without having to look for them, his mind and eye being intent upon what he is drawing. He is master of his accusative cases, and plurals, and irregular verbs; and that is what you ought to be to be professional artists. You ought to have at your fingers' ends all the perspective and other portions of elementary art. Simple things are what you should and must first learn. You cannot attend too much to simple beginnings. In the education of your eye you have to study art all round. You must remember that science and reason lie at the bottom of art, and art has much mechanism and method to pursue. A soul bursting with poetry would make but a poor artist unless it had mastered the tools of art. Another thing I urge upon our pupils is to take very great care to master the early principles of design. This is too big a subject for me to go into now. But steady your hand and your eye by working at the casts and models you see on the walls of the school, and as soon as possible take to figure drawing. If you draw a vase you only do so to train the eye and hand to make the curve properly, whereas if you draw a hand you get a variety of curves in the fingers. But it is impossible to draw the figure unless you first master what the figure is. An aged astronomer, despite his old and worn eyes, sees twice the number of stars in the heavens that the young astronomer does, because he knows where to look for them and how to look. The figures of those imperfectly trained, could they but stand upright, would tumble to pieces, because the ankles had no gristle and the legs had no bones. You cannot possibly learn to draw the figure without knowing what the figure is made of. Do learn construction. Learn the simple rules affecting the human figure, such as that the thumb moves at right angles to the fingers, and do not draw fingers which are all thumbs. I entreat you to take pains, and then you are sure to succeed. The noblest ambition of an artist is not his own distinction. His work is to contribute to human happiness, and his best work is that which does so by the power of a pure and noble motive, which animates his art because it animates himself. His work is a form of poetry. No work that can be worthy of the name of fine art can be otherwise. His choice of means is as wide as Nature; but his power of expression is bounded by himself. It is not every one that has power to originate; but it is no mean talent so to hold the mirror up to Nature as to reproduce in others the poetry which he learns from the things about him. It may be the talent of another man to affect his fellows by the ideal creations of his own imagination. But whatever it be, whatever form fine art may assume, realistic or ideal, all its worth and power depend on the embodiment and expression of an artist's own sympathies,—on the vital force which his work exerts on other minds; to

fascinate and elevate them by his own devotion for all that is purest, best, and noblest,—that lies not merely upon, but deep below, the surface of our mortal life.

COMPETITIVE FARM PLANS.

IT will be remembered that last year the Royal Agricultural Society offered prizes for plans of farm buildings as follows:—For arable farms above 300 acres and for arable farms not above 300 acres, for dairy farms above and for those under 100 acres, 50*l.* in each case. Sixty-eight sets of plans were sent in to the exhibition at Kilburn, of which three sets were disqualified.

The awards of the judges have at length been published. The judges considered they would fail in their duty if they awarded a prize to an admirable design, but which could not be carried out at a reasonable cost,—such a cost as a landowner would be justified in expending, and which the Enclosure Commissioners, who are the protectors of reversionary interests, would allow to be charged on entailed estates. None of the plans sent in could be erected within such limits; but the design which the judges considered exhibited the greatest merit in arrangement and detail, and which they, therefore, "highly commended," was that sent in under the motto of "Cheddar," by Mr. W. E. Keates, of Hanley, which represents a homestead and dairy arrangement suitable for a large farm of 400 acres. The estimate of cost by Mr. Keates was 6,146*l.* for homestead and dairy, exclusive of the dwelling-house, road approaches, and contingencies, which, as the judges point out, would, with the architects' charges, raise the outlay to upwards of 18*l.* per acre. To repay this outlay, they remark, with interest at 4½ per cent., in thirty-one years, would amount to 21s. 2d. per acre; while, if the outlay be repaid in twenty-five years, the annual charge would amount to 24s. 1d. per acre. Such a charge, the judges considered, no farm of 400 acres, even if it consisted of the best land and commanded the best market, could bear without loss to the owner, let attendant circumstances be what they might. At the same time, the judges say it is hardly possible to over-estimate the value of those arrangements which best secure economy in manual labour, and warmth and comfort to live stock; and it was the wish of the judges, while withholding the prize of 50*l.*, to convey by the expression "high commendation" their approval of Mr. Keates's design in these respects. The judges' report places Mr. Keates first in the list of competitors, and they are of opinion that a medal should be presented to that gentleman and to three of the other competitors. The judges' report, with ground-plans and isometrical views, and authors' descriptions, appear in the society's *Journal*, which has just been issued. The most striking feature in the exhibition of the plans, viewed as a whole, was the fact that the covering of stock and manure was the object most frequently aimed at,—a large number of the competitors adopting permanent roofs for foldyards, and in some cases for corn, straw, and hay-stacks. There is no doubt, the judges remark, that the principle of protecting from the weather both animals and manure has gained ground considerably since the society offered prizes for plans of farm-buildings thirty years ago. In the event of the prizes being renewed, the judges suggest that plans of the farmhouse should accompany those of the homestead; that the acreage of arable and pasture composing the sized farm for which plans are sought should be specified, and the amount of stock of all sorts to be provided for set forth; that a certain sum per acre should be named representing the amount of outlay which should not be exceeded, and that the plans should be in the hands of the judges a sufficient time previously to the opening of the show, to enable them to examine them fully.

The following is Mr. Keates's description of his plan:—"The annexed general plan is for a farm homestead providing accommodation for 400 acres of land, the bulk being in pasture and worked as a dairy farm. The cow-houses are all double, and provide tying for 112 milch cows, continuous and centrally placed. The calves are located at the south end of the cow-houses. The south-east range contains eight boxes, which are convertible into stalls, and on the south-west and immediately opposite the house are the nag stable, harness-room, and chaise-house, together with large box for calving, or for a brood mare. These buildings form the sides of two open yards, proposed to be kept clean and pitched with stone. In the centre of each is a spacious dung-shed, with liquid-manure tank conveniently placed for the reception and preservation of the manure made. These yards are open to the south and enclosed with a dwarf wall. The straw-barn and food-preparing room are annexed to the cow-houses, and extend north towards the stack-yard, with a gangway through on the south. The floor over this range contains granary, mill-room, and chaff-room. The mixing or preparing room is fitted with the cake and meal bins, chaff-steaming chamber, steamers, and tanks for mixed food and milk. The north range consists of wagon, cart, and implement sheds, artificial manure store, infirmary, engine-room, boiler-shed, and chimney-stack. The poultry-house adjoins the boiler and stack, and is provided with circulating-flues for warmth. Root-house, bulb-box, and tool-house. Adjoining the mixing-house, with a southerly aspect, are the pig-dens and courts for 150 pigs, all roofed in, with two open yards adjoining. The cart stables are placed on the north-east, and enclose a yard for colts or young stock, provided with a shelter-shed. On the west side, and opposite the cow-houses, is the dairy or factory for the conversion of the milk into cheese and butter, and comprises a milk-room, store for clean utensils, churning-room, engine-rooms, wash-house, cheese and butter making room. To equalise the temperature the walls are built hollow, with double roofs covered with felt, and tiled. A 6-ft. verandah is carried round three sides, and the windows are provided with outside Venetian shutters. The walls internally are lined with Marsden's patent glazed interlocking tiles. Throughout the premises particular attention is paid to the ventilation and drainage. All the feeding passages are fitted with a tramway, likewise the cow-houses, for the removal of the manure and milk. The buildings throughout to be supplied with water from a well, and pumped into a 3,000-gallon cistern for distribution. A 10-horse power engine for the farm premises, and a 3-horse power engine for the dairy, fed from a Cornish boiler, will work all the machinery and pump water. The roofs are spouted and drained into a tank near the boiler. The dairy premises to be heated by hot-water pipes in the winter, and means are provided for raising the temperature of the water supplied to the cows."

The plan third on the list of "commended" ones is by Mr. A. Dudley Clarke, of Sundorne, Shrewsbury, whose design is for buildings suitable for a 400-acre farm, 300 of which are arable and 100 pasture. The total estimate, as per ground plan, is 4,093*l.* 7s. 1d.

THE SEWERAGE WORKS FOR THE CROYDON RURAL SANITARY AUTHORITY.*

THE sewerage works at the present time under course of construction for the Croydon Rural Sanitary Authority involve the construction of over thirty-six miles of brick, brick and concrete, and pipe sewers; the erection of a pumping-station, with the necessary machinery for pumping the low-level sewage, and for the subsequent treatment of the sludge; the preparation of an intermittent filtration area for the purification of the sewage; the construction of an iron bridge over the river Wandle; the boring of an artesian well, and the erection of two detached cottages; in connexion with the sewerage and disposal of the sewage of the parishes of Beddington, Merton, Mitcham, and Morden, and the hamlet of Wallington, Surrey, containing a rapidly-increasing population, estimated at the present time at about 17,000.

The system adopted throughout for the drainage of these districts is the water-carriage system, with which all engineers are familiar.

The rainfall is not admitted into the new sewers, but is conveyed directly to the natural watercourses, by the sewers existing previously to the construction of the new system, which are in every case retained for this purpose.

Nearly the whole of the sewage will flow directly on to the filtration area by gravitation alone, a portion only of the districts of Merton and Morden, containing about 300 houses, requiring the services of a low level outfall, whence the sewage is subsequently pumped at the sewage works from a depth of 20 ft. into the gravitation outfall.

Manholes, circular in form, 5 ft. internal diameter at the bottom, and 2 ft. at the top, are constructed at all intersections of streets, and at each junction of a branch with a main sewer; also a manhole or combined ventilator and lamphole is placed at each change of direction or gradient of the sewers, the straight line principle being adhered to with few exceptions throughout. Any part of the system may be thus readily examined, and the locality of any defect or obstruction be at once detected. The outlet from each manhole is provided with a stoneware flushing-block, having a ground face, and two projecting iron clips for the reception of a wooden stop-board as an arrangement for flushing. The inlets are each provided with a stoneware balance-valve, having an iron flap hung at the top, and in the centre of the flap a screwed spindle with ball at end, by means of which the amount of opening at the bottom can be easily arranged. The object to be obtained by the use of these valves is to prevent the passage of currents of air through the sewers, and to localise and expel the gases generated in each division.

These manholes and ventilators are finished at top with a Latham's patent spiral charcoal ventilator, a full description of which may be found in "Sanitary Engineering," by Baldwin Latham, and also in the illustrated catalogues of the principal manufacturers of fittings for drainage works. The author does not purpose to discuss in this paper the question of the effect of charcoal on the gases which are eliminated from sewage, there being many standard works of reference on this subject.

The minimum fall for the various sizes of sewers is as follows:—

27 inch	1 in	1,200
24 ,,	1 ,,	900
18 ,,	1 ,,	900
15 ,,	1 ,,	700
12 ,,	1 ,,	500
9 ,,	1 ,,	300

and the whole of the sewers will be self-cleansing, as the minimum velocity in any sewer when running half-full will be 118 ft. per minute.

Flushing-wells are constructed at various points on the system, the points selected being such that a sufficient supply of subsoil-water may be obtained for flushing purposes, and as large a district as possible be under the influence of the well. These flushing-wells are constructed in a similar manner to the manholes, with the exception of the bottom works being laid dry to allow of the accumulation of the subsoil water in the well. They are connected to a manhole on the sewers by a line of pipes provided with a sluice-valve, on opening which the flushing of the sewers is easily and readily effected.

The pipe sewers at all crossings under railways or rivers are constructed of cast iron, and the brick and concrete sewers are strengthened by an additional ring of brickwork.

The cement used on the works is the best Portland. No cement is used that is incapable of bearing a tensile strain of 350 lb. to the square inch when tested on a section having an area of 2½ square inches, after seven days' immersion in water. An Adie's cement-testing machine is used for testing the brickquettes.

The proportions for the concrete are six measures of clean gravel and sand to one measure of Portland cement; and the cement-mortar, two of clean sand to one of Portland cement.

The pumping machinery, manufactured by Hathorn, Davey, & Co., of Leeds, comprises a pair of horizontal rotative pumping-engines. Each engine and pump is capable of lifting 7,500 cubic feet of sewage 20 ft. high per hour, when working at not more than thirty revolutions per minute, in addition to driving the gearing for one chemical mixer and one pump for the filter-presses, which are referred to hereafter.

The steam cylinders are 12 in. in diameter, stroke 20 in., fitted with slide and expansion valves. An air-pump and a condenser self-contained in one casting are provided for each engine, worked from the end of the engine piston-rod. The boilers are of the Cornish type; diameter, 5 ft. 3 in.; length, 14 ft.; flues, 2 ft. 9 in. diameter. The fly-wheels each weigh 1 ton. The main pumps are similar to those designed by Mr. Baldwin Latham for the

* From a paper by Mr. W. Santo Crimp, C.E. Read at the Mitcham meeting of the Association of Municipal and Sanitary Engineers and Surveyors.

Dantzic sewerage works; each pump having a piston and plunger 22½ in. and 16 in. diameter, with a stroke of 20 in., the pumps being worked directly from a disc on the end of the crank-shaft.

There are two filter-presses for the treatment of the sludge, one of Needham & Kite's, and one of Johnson's.

The sewage from the high and low level sewers will be received into the tanks within the pumping-station, and after being filtered through coke, will be conveyed, by means of properly-constructed main and subsidiary carriers, into the filtration area; the deposited sludge being subsequently treated by chemicals and by the filter-presses.

The intermittent filtration area for the final reception and purification of the sewage consists of an area of land 28 acres in extent. The character of the land varies considerably, being composed of alluvial deposit overlaying the London clay, the constituents of the deposit being beds of gravel and sand, marsh, clay, and peat. The depth from the surface of the ground to the London clay varies from 3 ft. to 17 ft. Subsoil-drains for the reception of the purified effluent will be laid at the requisite levels. The impervious beds, where necessary, will be burnt into ballast or removed, and suitable porous material substituted down to the level of the subsoil-drains. The purified effluent will eventually flow into the river Wandle.

The whole filtration area is inclosed by a clay puddle wall 2 ft. in thickness, the excavation for which has been taken down 1 ft. into the London clay. It has the effect of effectually preventing the passage of any water either from the river Wandle or the surrounding water-logged strata into the filtration area.

An artesian well has been sunk at the pumping station for supplying the water required for the condensers and for other purposes. This well is 6 in. in diameter, lined with cast-iron pipes, fitted with wrought-iron flush collars, the bottom pipe being provided with a steel shoe. The well is bored to a total depth of 230 ft. through the following strata:—

Alluvium	12 feet.
London clay	80 ,,
Woolwich and Reading beds	40 ,,
Thanet sand	47 ,,
Into the chalk	51 ,,

Depth to chalk 179 ft., the bottom 30 ft. of which is not lined. The volume of water flowing from the well, and which is derived from the chalk, has remained constant since the completion of the boring. The yield is at the rate of 5·79 cubic feet per minute, or 52,100 gallons per twenty-four hours, and the temperature of the water 54 degrees.

These works were designed and are being carried out by Mr. Baldwin Latham, C.E., as engineer-in-chief, the author acting as resident engineer.

The total amount of the contract for the whole of the specified works is 74,708l., the contractors being Messrs. B. Cooke & Co., of Phœnix Wharf, Battersea.

THE NEW ROYALTY THEATRE, GLASGOW.

THE new theatre in Sauchiehall-street, Glasgow, built by the Central Halls Company, for Mr. E. L. Knapp, has been opened within the last few days, Offenbach's "Madame Favart" being the entertainment. But previously to the performance of the opera the audience rose *en masse*, and, led by the Glasgow Select Choir, sang the National Anthem. Though from an artistic point of view the house has not yet received the finishing touches, one can easily form an idea of what it will actually look like two or three weeks hence. When Mr. Toole laid the commemoration-stone, a couple of months ago, we gave details of the general structure, and it is only necessary now to refer to the internal arrangements. The theatre is like the Gaiety, in London. From all parts of the house a good view of the stage can be obtained without twisting one's neck. The balcony is of ogee contour, with an elaborately designed front. The front of the amphitheatre is decorated with gilt shields, having a coloured *fleur de lis* device placed at intervals of 5ft. and 6 ft., and the fronts of the stage-boxes are corbelled out over the entrances to the orchestra-stalls, having pilasters on either side. A head of Shakspeare, and other pieces of carved work in the form of female figures, give considerable character to the box-decorations. The sides of the proscenium are formed by pillars of wood and composition. The plan of the roof is an octagon within a square; in the centre there is a large sunlight containing nearly 200 jets. There is another sunlight, with 150 jets, and when the whole are lighted the compact little theatre, with its pleasant tints, has a brilliant appearance.

The architects of the building are Mr. James Thomson and Mr. Frank Matcham; the contractors, Messrs. J. Devlin, Eadie, & Co.; the wood-carving, decorative work, and gilding, were executed by Messrs. Allan; the ornamental and general painting by Mr. J. Fletcher. The act-drop, the subject of which is "The Happy Days of Charles I.," is from the brush of Mr. Hawes Craven, London.

THE TRAINING OF AN ARCHITECT.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.

AT the annual meeting of the Birmingham Architectural Association, a few days ago, the President, Mr. W. Hale, delivered an address on the training of an architect. He remarked that as a very considerable amount of attention was being given throughout the whole country to education in general, he thought they might consider the subject as applicable to the training of an architect. Though it might, perhaps, be too late to say much that would be new on a subject which had engaged the earnest thoughts of leading men in the profession, still it was well to consider whether we were progressing or standing still; whether it was not possible to do more than we were doing to promote the true advancement of our art; and if the educational courses were the best to attain that object. It was necessary to define what an architect was, what were his capabilities of training in order to render him competent to discharge his duties, and to consider if the means usually employed were within the reach of the majority of the students. In early times the architect was probably also a builder; and in later times he was still called "the chief builder"; and although the designation of "architect" appeared to have been altered to "surveyor" or "surveyor of works," one master mind directed the whole, preparing the general design and the detailed parts. In Mediæval times lodges of itinerant masons were supposed to have designed and also erected with their own hands, the noble buildings then so lavishly built; but though it may be possible that some minor details of moulding or carving may have been delegated to individual talent or caprice, still it would be admitted that one architect or director of the works conceived the whole work. In his "Gothic Architecture in Spain," Mr. Street stated that he found ample evidence of this when measuring and studying the various Spanish buildings. At the present time an architect's duties were more complex, and he could not often devote that amount of care to every detail which characterised the practice of his more fortunate predecessors, who, in the quiet of the cloister, were enabled calmly to mature their designs, and watch their gradual growth. Now, instead of carrying out one important building at a time, architects in large practice had many works in different parts of the kingdom, so that much had to be delegated to others, and as a consequence the impress of their minds was not so apparent. To discharge his duties efficiently an architect should be artist, surveyor, engineer, and man of business, and also have a knowledge of the laws affecting buildings and land. It was essential that the training of the student should be as systematic as possible, and begun as soon as the general school education was completed, for the young architect's powers often asserted themselves strongly during the first few years of his studies and early practice, and time would not add much to his genius or to his powers of originality. The student should, before entering an office, have received a sound liberal general education, otherwise he would have to work all the harder, for without good general information an architect could not expect to hold his own. A knowledge of Latin and Greek was most advantageous, as they were the key to many forms of thought and expression in the more modern languages; but they were not necessarily essential to a proper study of the architecture of Greece and Rome, as the beauties of these had been set forth in our own language by our most competent men. He advised all, however, to read the works of modern French and German writers on art, and to acquaint themselves with the architectural feelings and works of our neighbours. A perfect knowledge of the ordinary rules of arithmetic was indispensable, and of algebra and higher mathematics most useful, and likewise a knowledge of practical geometry. He could not lay too much stress on the necessity for acquiring a mastery of perspective, and they would learn more from carefully studying one building than from a superficial examination or sketch of several. Freehand drawing must be constantly practised,—first from copies, but as soon as possible from Nature herself. Proportion, although not necessarily by itself beautiful, was a property invariably present in the highest degree in every really beautiful work of art, and there could be no good architecture unless proper proportion of parts has been studied or is apparent. Architects differed more in opinion with respect to the beauty or appearance of a building than did the professors of any other art. All good harmony or proportion was founded on a relation to rest, and it would be found that of all the finest buildings in every style, those were the most pleasing to an educated eye in which the parts were well balanced, and composed a harmonious whole, having perfect repose or freedom from unrest, in which every part fitted easily and gracefully in its appointed place. The late Professor Cockerell, than whom no better authority on Classic architecture could be quoted, said, "To give magnitude, multitude of parts is necessary; beauty of proportion arises from inequalities, and by proportion character is given to a building." In illustration of this he stated "that there was a small figure of Hercules which, although it may be held in the hand, yet as you look at it it seems to expand into a Colossus; while, on the other hand, the interior of St. Peter's at Rome was so ill-devised that it looked smaller than it really was." Classic architecture was most pleasing when worked out in accordance with those rules which Professor Cockerell, and other eminent architects who practised that style, had so successfully followed. He would, therefore, endeavour to induce all to study to proportion the different parts of their designs to each other and to the whole, more especially the main features, as it was these that first favourably or unfavourably impressed the beholder. Another branch of drawing was sciography, by which was taught the projection of shadows, and which should be considered with proportion. Without a sound knowledge of the principles of construction it would be impossible to have a building of the highest order of art; for it was now an acknowledged axiom of design that good architecture should be based on the main features in the arrangement and construction of the building. Construction seemed somewhat uninviting to many, but the conviction that all who wished to excel or even to properly carry out any building must have this knowledge should induce every student to do his best to master this indispensable part of an architect's education. Intimately connected with construction was the knowledge of taking out quantities, which necessitated a systematic and careful examination of a building in every part of its construction. Unless an architect was perfectly familiar with taking out quantities he could not write a workable detailed specification, but must confine himself to generalities, and open the door for a good deal more trouble in carrying out a work, and possible annoyance to the builder and to himself. He was aware that some objections were taken to this, but all young architects should make a practice of qualifying themselves for doing this. Another useful though not indispensable requisite in the education of an architect was water-colour drawing. The President then directed the attention of the students to the means usually employed in training. Outside the office there were agencies for self-help which did not exist a little more than a quarter of a century back. There were associations like that, institutes and schools of design everywhere, but he would plead for something more. Pupils should not be allowed the run of the office, but should be considered as a charge whom the chiefs are bound to look after, and guide with counsel. There should above all be a willingness to work and learn on the part of the student himself. The Royal Institute of British Architects were taking a step in the right direction. After May,

1882, no one would be admitted a member of the Institute without previously passing an examination, both as an Associate and again as a Fellow. The details of the scheme were now under consideration, and perhaps it was not altogether vain to hope that in some ten years or less it would not be lawful to practise a profession on which, with respect to the goodness or badness of their homes, the health, happiness, and prosperity of every one in the country depends, without first obtaining a diploma.

POSITION OF THE INSTITUTION OF CIVIL ENGINEERS.

THE annual general meeting was held on the 23rd of December, Mr. Bateman, F.R.S., the president, occupying the chair. In the report of the Council it was stated that during the year the Council had been engaged in effecting the separation of the professional from the non-professional Associates, in accordance with the directions of the special general meeting of the 2nd of December, 1878. The qualifications and antecedents of 1,670 Associates had to be separately considered, of whom 1,080 had been transferred to the group of Associate Members, leaving a residue of 590 in the original class. The elections had comprised 1 Honorary Member, 40 Members, and 152 Associate Members, besides 23 Associates not entitled to the privileges of corporate membership; while 68 Associates had been transferred to the class of Members. On the other hand, the deductions had been, by deaths, resignations, and erasures, 71 Members, Associate Members, and Associates. There had been an addition in the twelve months of 1 Honorary Member, 79 Members, and 65 Associate Members or Associates, representing a total increase of 145. The gross numbers on the 30th of November last were:—17 Honorary Members, 1,140 Members, 1,221 Associate Members, and 582 Associates, making a total of 2,960, irrespective of the Students. This aggregate was more than double that it was twelve years ago. The Student class now numbered 584, of whom 150 were admitted last session, when 43 Students were elected Associate Members, and 24 ceased to remain on the list, so that the net increase had been 84.

The statement of accounts showed that the receipts, grouped under three heads, were,—from annual subscriptions and from dividends on Institution investments, 10,960*l.* 11s. 9d.; from admission fees and life compositions, 2,837*l.* 12s. 6d.; and from trust funds, 431*l.* 13s. 5d.; together, 14,229*l.* 17s. 8d. On the other hand, the disbursements, similarly distributed, were,—for ordinary expenditure, 9,826*l.* 10s. 7d. (including 4,568*l.* 19s. 3d. on account of "Minutes of Proceedings"); for Institution investments, 4,093*l.* 1s. 2d.; and for trusts, 530*l.* 18s. 9d.; making a total of 14,450*l.* 10s. 6d. The difference between the two sides of the account was met by the bankers' balance being less by 220*l.* 12s. 10d. than it was twelve months ago. The accumulated property of the Institution now amounted to 31,094*l.* 1s. 8d., the interest on which constituted rather more than one-tenth of the annual income. The nominal or par value of the trust funds, held for the purpose of awarding premiums, was 14,642*l.* 13d. 10d., the whole of which stood in Government securities.

The following gentlemen were duly elected to fill the several offices in the Council for the ensuing year:—Mr. William Henry Barlow, F.R.S., President; Mr. J. Abernethy, Sir W. G. Armstrong, C.B., F.R.S., Sir J. W. Bazalgette, C.B., and Mr. J. Brunlees, Vice-Presidents; Mr. G. Berkley, Mr. F. J. Bramwell, F.R.S., Mr. G. B. Bruce, Sir John Coode, Mr. E. A. Cowper, Mr. A. Giles, M.P., Sir Charles A. Hartley, Mr. H. Hayter, Dr. W. Pole, F.R.S., Mr. R. Rawlinson, C.B., Dr. C. W. Siemens, F.R.S., Mr. D. Stevenson, Sir W. Thomson, F.R.S., Sir Jos. Whitworth, bart., F.R.S., and Mr. E. Woods, other Members of Council.

The Panama Canal.—At a recent meeting held at the Society of Arts, Captain Bedford Pim, M.P., read a paper on the proposed canal across the Isthmus of Panama. He said that now that the subject had been introduced by M. de Lesseps, the project of inter-oceanic communication between the Atlantic and Pacific was calculated to arrest the attention and stimulate the energy of those interested.

THE GOLDSMITHS' COMPANY'S NEW BUILDINGS IN CHEAPSIDE.

A FINE block of buildings has just been erected on the south side of Cheapside for the Goldsmiths' Company. This corporation is one of the richest of the City companies, and has latterly erected several new buildings in different parts of the city. The block in question consists of a series of shops on the ground-floor, with four lofty stories above, and surmounted by pedimented dormers, between which are balustrades and finials. The buildings are carried to a height of nearly 70 ft., and have a frontage to Cheapside about 80 ft. in length. The main face of the elevation is in Portland stone, but ornamentation in polished granite largely prevails, whilst there is a profusion of carving and sculpture in various parts of the frontage from the first to the upper floors. Piers in red polished granite are carried between the windows from the shop entablature to the top, whilst across the entire elevation there are grey polished granite panels at the foot of the windows of the several floors. The second-floor windows are a special feature in the elevation, being surmounted by massive projecting pediments richly carved.

The architects are Messrs. Ford & Hesketh, of Aldermanbury, and the contractor is Mr. Lawrence, of the City-road. The buildings are rapidly approaching completion, and the shops and several other parts of the buildings will shortly be occupied by the former occupants, including Messrs. Collard & Collard, the well-known pianoforte manufacturers.

TRUTH IN NATURE AND ART.

TRUTH in art, like truth in nature,
Is perennial: for all time.
Men may coin a nomenclature
For design in every feature,
And still miss the truth sublime.

Study Nature in creation,
How triumphant she can speak;
Changes may through cultivation
Come in garden and plantation,
But in essence there's no break.

From the seed, where'er the sowing,
Springs its like in stem and leaf;
You may dwarf it in the growing,
But can't change it past the knowing,
By a change in your belief.

Men, like plants, may change in colour,
But the seed bespeaks the fruit;
Though one tree in bloom be duller
Than the next with blossom fuller,
Both are still akin in root.

Art's not art if it's unfaithful,
It is only artifice;
Oh! art-seekers who are youthful
Your art-mission will be fruitful
If you work believing this.

C. CLINTON HOBY.

TUNIS AND ITS LIGHTS.

IT would seem that the German traveller from whom we obtained a few particulars of Tunis (p. 1356, Vol. xxxvii.) must have paid his flying visit at a moment when there was some interruption in the supply of gas, leading him to fancy there was none. Mr. Chas. E. Botley, C.E., writes to us concerning it:—"Having spent some time at Tunis in 1878, I may inform you that Tunis has been lighted with gas since 1874. The concession is the property of an English company, and although the use of gas is not much patronised by the Arabs, there are about five miles of mains, and the English railway station, consulates, hotel, *cafés*, theatre, Philharmonic and Masonic halls, and principal streets in the European quarter, are lighted with gas, and its use is rapidly extending. The Arab square and bazaar, opposite the bey's residence, and near the Casbah, and the exterior of some of the mosques, are also supplied with gas; and at the close of the feast of the Ramadan, the consulates, bey's residence, &c., are illuminated in the same manner. The bey has had nothing to do with the construction of the railways beyond granting the concessions. The line from the port of Galetta to Tunis is owned by the Tunisian Railways Company (Limited), of London; and the other line, from Tunis to Algiers, is being made by the Compagnie Batignolles, the French Government guaranteeing 6 per cent. subvention on the cost. The bazaars are covered in, which makes them very close. Where any paving exists in the Arab quarter it extends right across the narrow street, about 10 ft. or 12 ft. wide, and, therefore, there is no fear of falling off the pavement."

CHRISTMAS IN EXETER.

THREE HUNDRED of the aged poor at Exeter,—many of them, in former years, craftsmen in the various building trades,—were entertained sumptuously on Christmas-day, at the Victoria Hall, in the good old ancient city. The Mayor, High Sheriff, the Chief Constable, and other gentlemen, assisted at the feast, the chair being occupied (for the eleventh successive time) by Mr. Harry Hems.

After the repast, Mr. Hems read a letter he had received the same morning from her Majesty the Queen, expressive of her sympathy and her great interest in the gathering. The punch-bowl steamed and the pipe smoked in kindly unison all the afternoon, and, to while away the time, Christmas carols, &c., were beautifully rendered by some of the cathedral choir and other musicians. Another meal followed, in the shape of tea, and then the tables being cleared away, the ancient ones footed it with glee, getting through the various country dances with surprising vigour. On leaving at night, every guest was presented, according to custom, with half a pound of tea, a pound of plum pudding, and a shilling. The poor old people contrived during the day to get through, amongst other items, nearly 2 cwt. of beef, twenty geese, a farmyard-ful or so of ducks and fowls, 5 cwt. of plum pudding, and four barrels of beer.

The hall had been decorated for the occasion with exotics and other rare plants, lent by Lord Poltimore and other gentlemen.

The Chancellor of the Exchequer (Sir Stafford Northcote), the Lord Chief Justice of England (Lord Coleridge), Earl Devon, and more than a dozen other noblemen, contributed towards the expenses of exercising this seasonable hospitality.

All this shows a genuine and kindly feeling existent.

PROPOSED NEW TOWN-HALL FOR SOUTHWARK.

A MOVEMENT is on foot for the erection of a new town-hall in Southwark, it having for some time past been found that there is no large public room in the borough convenient for meetings and other public purposes, the old town-hall having been removed, and other buildings now erected on the site. The site spoken of for the proposed new town-hall is a large piece of land called the Cross Bones Burial-ground, which it appears will fall into the hands of the authorities of St. Saviour's, Southwark, on the expiration of the lease.

WELBECK ABBEY.

ARCHITECTURE UNDERGROUND.

SOME years ago we described the unique works in progress at Welbeck Abbey, the seat of the Duke of Portland. The death of the late duke invests the subject with a new interest. We add a few particulars from local sources.

The grounds seem to be literally undermined. Extending in all directions from the abbey are burrows or passages; not mere borings or excavations, but lofty spacious passages, brilliantly lighted by costly apparatus for letting in sunlight, and where sunlight cannot be admitted, by lights from gas. By an underground passage we come to the celebrated riding-school, the like of which is not to be found in Europe, or in the world. It is entered by a trap-door, opened by means of a curiously-designed crank in the passage. In the days of the Duke of Newcastle it was used as a riding-school; now it is a magnificent museum of art over 180 ft. in length. Hundreds of pictures are arranged,—not hung,—round the gallery, and piled in stacks on the floor are thousands of volumes of books, some modern, and many old, rare, and valuable. The floor of this gallery is of oak, and the ceiling is made to represent a brilliant midsummer sky. Mirrors in profusion are placed about, and light is shed from four chandeliers suspended from the roof, and each weighing a ton. This apartment is lighted up by over 2,000 gaslights, and when all are illuminated the effect must be extremely brilliant. There are some miles of passages under the grounds. One extends from the abbey half the way to Worksop; another

was used only by the late duke. The passages are all broad enough for three people to walk abreast in them, and pleasant to walk in. The library, like the picture-gallery, is underground, and is the work of many years. It is divided into five large rooms, and so arranged as to form, when desirable, one very large room. This library is 236 ft. long. Another immense and superbly-constructed room has been erected underground. At one end it is approached by a spiral staircase, and at the other by subterranean passages. Church or ball-room? It would do admirably for both. It was begun five years ago, and it is left in an incomplete state. There are many of these rooms at Welbeck. They are free from draughts, admirably lighted, and magnificently decorated, and all very costly. Comparatively few outbuildings are to be seen. The most remarkable is the new riding-school, a building of gigantic proportions and of extraordinary beauty. The walls are of solid stone, and the roof of wood, iron, and glass. It is nearly 400 ft. in length and 100 ft. wide, and divided into a great centre and two aisles. The central department is decorated with a frieze of painted brasswork representing birds, beasts, and foliage, and of perfect workmanship and elegant design. It is 50 ft. high, and lighted by 8,000 gas-jets. Here the duke took pleasure in seeing his horses exercised. The "works" are marvels. He employed constantly upon them over 2,000 workmen.

According to a Sheffield paper (the *Independent*) orders have been issued by the Duke of Portland to finish the work which the late Duke left in an unfinished state at Welbeck. It is understood that the work will be continued at once in all cases, and pushed on as rapidly to its termination as possible.

THE NEW BOLTON INFIRMARY.

THE Infirmary now in course of erection on the Bridge House Estate, near Chorley-street, Bolton, is designed on the pavilion principle, and will consist of four blocks, connected with each other by corridors. The administrative pavilion is placed in the centre, and contains the principal entrance, board-room, operating-room, &c., together with the nurses' and servants' bedrooms. In the pavilion to the right the ground-floor is set apart for the dispensary and for the out-door patients' department. This pavilion also contains the receiving wards. On the upper floor is the women's ward, containing fourteen beds. The left-hand pavilion is a two-storied building, with a ward for fourteen beds on each floor, with nurses' rooms adjoining. There are also seven small wards, which can be used for convalescent rooms if desired. In addition to the staircases, lifts are provided for hoisting the patients to the different floors. A prominent feature of the design is the children's hospital, which (says the *Bolton Chronicle*) owes its existence to the bounty of the late Dr. Chadwick, who left 5,000*l.* towards its erection and endowment. It consists of two wards with eight beds each, with nurses' room, and a large day or recreation room. This portion of the buildings overlooks the Park, and communicates with the main building by a circular corridor. The buildings are Gothic in style, and are of brick, with Yorkshire stone dressings, the roofs being covered with Westmoreland green slates. A tower, 102 ft. high, rises from the centre of the administrative block. Haden's stoves are used for warming purposes. The contract, amounting to about 20,000*l.*, has been let to Messrs. Maraden, of Bolton, the architect being Mr. R. Knill Freeman, of the same town.

COMPETITIONS.

Hull.—At a special meeting of the Building Committee of the proposed new borough asylum, Mr. Iveson, the justices' clerk, forwarded the committee a communication from Mr. B. Hartley, of Pontefract, who had examined the six plans sent to him, and had come to the conclusion that the plan possessing altogether the greatest merit was that marked "Argus," to which he recommended that the first prize be awarded. He considered the next in order of merit to be that by "Experientia," and the third "Lucidus Ordo." Mr. Hartley offered to meet the committee, and give his reasons for the decisions, "it not being advisable to commit them to writing."

The Victor Emmanuel Monument.—The committee appointed to obtain plans for the erection of a national monument to Victor Emmanuel has decided, after a long discussion, to open a contest to artists of all nations, allowing them the utmost freedom in regard to the form of the memorial itself and in its most appropriate site. Three prizes of the value respectively of 50,000*f.*, 30,000*f.*, and 20,000*f.*, are offered for the best designs. The models are to be in potter's earth. At the next meeting the terms of the competition will be settled and the jury selected.

OBITUARY.

Mr. Hepworth Dixon.—We record with deep regret the death (on Saturday last) of Mr. William Hepworth Dixon, who for more than a quarter of a century has occupied a deservedly prominent position in the literary world. The immediate cause of death was apoplexy. Mr. Dixon had been slightly unwell for some time past, and we have reason to believe that he never fully recovered the effects of the shock he sustained on hearing of the sudden death of his son, Mr. Jerrold Dixon, in Dublin, last October. Mr. Dixon was a native of Manchester, where he was born on June 30, 1821. He has thus been cut off at the comparatively early age of fifty-eight. His father was Mr. Abner Dixon, of Holmforth and Kirk Burton, in the West Riding of Yorkshire. While still a young man he acted for a short time as editor of a paper published at Cheltenham. He quitted Cheltenham in 1846 for London, where he entered himself as a student at the Inner Temple. But literature had more attractions for him than law, and he soon became known by his writings contributed to various newspapers and periodicals. In 1851 he acted as Deputy Commissioner to the Exhibition Commission. After a tour in Europe, in the course of which he visited Italy, Spain, Germany, and Hungary, Mr. Dixon in 1853 was appointed chief editor of the *Athenæum*, a post which he held till 1869. In 1864 he made a long journey through Turkey in Europe, Asia Minor, Palestine, and Egypt, the literary result of which was the "Holy Land," in two volumes. On his return Mr. Dixon assisted in founding the Palestine Exploration Fund. In 1866 he made an extensive journey through the United States. Apart from his purely literary work, Mr. Dixon has done good service to letters. He assisted to obtain free access for historical students to the State papers of the country, which, up till the time of his intervention, had been jealously guarded by the various Secretaries of State. While in America he had the good fortune to discover and recover a long-lost Irish State paper. It was largely owing to his efforts that the Tower of London was opened free to the public. In 1870 Mr. Dixon was elected to the London School Board. In 1872 the Emperor of Germany created him a Knight of the Order of the Royal Crown. One of his best known works is "Her Majesty's Tower," and the concluding volumes of his work on "Old Windsor" were in progress at the time of his death. The last time we saw him (the day before his son died) he seemed harassed by hearing that the printers required thirty additional pages to complete the third volume of "Old Windsor," contrary to his belief that he had already supplied sufficient matter for the purpose. The night before he died he had revised the last proof-sheet of that volume. Mr. Dixon was an admirable conversationalist, and a welcome guest in many houses.

Mr. George Raphael Ward.—We note with personal regret the death, on the 18th ult., of Mr. George Raphael Ward, painter and engraver, son of the late Mr. James Ward, R.A., and father of Mrs. E. M. Ward. He had attained the age of eighty-one years, and for some months had been confined to the house. Early in life Mr. Ward became a student in the Royal Academy, where he gained a medal. Later he was frequently employed in producing miniature copies of Sir Thomas Lawrence's portraits, in doing which he attained considerable skill. After the death of Lawrence, Mr. Ward returned to the practice of engraving, and produced some excellent plates, chiefly in mezzotint.

The Buccleuch Collection of Etchings and Engravings.—A loan collection of etchings and engravings belonging to the Duke of Buccleuch has been opened for exhibition in the Museum of Science and Art, Edinburgh. The collection embraces 390 works of art, including the *Liber Studiorum* of Turner, and etchings by Rembrandt and Adrian Van Ostade.

SATURDAY AFTERNOONS AT THE PARKES MUSEUM OF HYGIENE.

THE Committee of the Parkes Museum and the Council of the Working Men's Club and Institute Union have arranged for a series of demonstrations to working men on Saturday afternoons, commencing on January 3rd, when Professor Corfield will explain the uses of the varied appliances connected with house-drainage which are in the museum. The subsequent demonstrations will be on "Ventilation, Lighting, and Warming," by Professor Corfield; "Food," by Dr. G. V. Poore; and "The Hospital and Sick-room," by Dr. J. C. Steele.

A NEW BUILDING ESTATE AT BATTERSEA.

THE mansion and estate at Battersea, near the Clapham Junction Station, covering an area of upwards of twenty acres in extent, which has for several years been occupied by Mr. H. M. Soule, who is leaving the neighbourhood, has just been sold, and the purchasers are about to lay it out for building purposes. It is said to be one of the oldest suburban residences in this part of Surrey. The intention is to erect chiefly small and middle-class houses, at a moderate rental, suitable for clerks and others with limited incomes.

AUCTIONEERS' RESPONSIBILITIES.

TOWNSEND *v.* ETCHES.

AT the Whitchurch (Salop) County Court, on the 16th ult., before Judge Yates and a jury, a case of importance to auctioneers was heard and decided.

Mr. James Townsend, a money-lender residing in Manchester, brought an action against Messrs. Etches, Nunnerley, & Etches, auctioneers, to recover the sum of 35*l.* 18*s.* 9*d.* in respect of the wrongful sale of seven cows over which the plaintiff held a bill of sale; and also for damages which the plaintiff alleged he had sustained in consequence of the badly-managed and hurriedly-conducted sale of certain furniture and effects which were included in the said bill of sale.

It would appear that in May last a farmer named Parker, residing at Swanbach, Cheshire, borrowed from the plaintiff the sum of 40*l.*, giving a bill of sale on his household effects and farming stock as security for the repayment of the loan. On the 15th of July Parker filed a petition for liquidation, under which Mr. J. C. Etches (the senior partner in the defendants' firm) was appointed trustee. On the previous day—the 14th of July,—Parker sent seven of his cows for sale by defendants at a periodical sale held by them at Crewe. The cows were entered in the usual way, and realised 90*l.* odd, a portion of which amount the defendants handed over to Parker, the remainder, after deducting their commission and expenses, being paid to several persons to whom Parker was indebted; and at his (Parker's) request, a short time after, Mr. Manley, of Aston, sold at the defendants' directions Parker's furniture and effects, over which the bill of sale was held, and although the defendants' valuation of the goods was something like 95*l.*, the sale realised only 47*l.*, in consequence, as the plaintiff alleged, of the careless and hasty manner in which the auction was, at the instance of the defendants, conducted.

For the defence, it was denied that the sale of the furniture and effects was conducted otherwise than properly. At the time of the auction, and of the sale of the cows, the defendants alleged they were not aware of the existence of the bill of sale, no formal notice having been given them of it. The proceeds of the sale had, by the direction of the Court, been handed over to the plaintiff, after deducting the cost of the sale.

The jury found for the plaintiff for the full amount claimed, the foreman remarking that they thought it was very hard that an auctioneer should be subject to claims of this description.

His Honour concurred in this opinion, but said he was afraid they must have the law altered before they got any protection.

CASES UNDER THE METROPOLITAN BUILDING ACTS.

AT the Lambeth Police-court, on the 24th ult., Mr. Henry George, builder, Cranham-street, was summoned by Mr. Jarvis, District Surveyor for Camberwell, under the Metropolitan Buildings Act, for not complying with the 15th section of the statute in two houses in Rye-lane, Peckham.

Mr. J. Thompson, barrister, appeared in support of the summons, and stated that an iron bressummer must have a brick or stone pier, or be placed upon a wooden or iron story-post, in addition to its bearing on the party-wall.

The defendant contended that iron girders were not bressummers. The object of the Act was to prevent the use of timber, and he had put in an iron girder.

Mr. Jarvis insisted that as the 15th section

had not been complied with, he was bound to summon the defendant. The absence of what he (Mr. Jarvis) required was likely to be the cause of a serious accident.

Mr. Chance said the words of the Act had certainly not been complied with, and he must make an order that the work be done within fourteen days.

Mr. Thompson asked for costs, and the magistrate ordered a sum of 3*l.* 3*s.* as costs to be paid by the defendant.

AT Bow-street Police-court, on the 27th ult., Mr. C. Fry, from the solicitor's office of the Metropolitan Board of Works, appeared to support a summons against the owner of No. 2, Harvey's-buildings, Strand, for allowing the premises to be in a dangerous condition.

Mr. Robert Walker, District Surveyor for St. Martin's-in-the-Fields, stated that he surveyed the house by order of the Board on the 17th of December, and found the chimney-breast and party-wall so dangerous that he directed the Board's contractor to shore it up at once, which was done. On the 23rd ult., when the builder commenced to pull down the breast, the greater part fell with a crash, nearly burying the workmen, and the party-wall and remainder of the breast were immediately dangerous, and it had been necessary to warn the inmates not to stop in the house, and also to report the party-walls to the two next houses as dangerous.

Mr. Flowers, the magistrate, at once made the order.

SEPARATE DWELLINGS *v.* LODGINGS FOR ARTISANS AND LABOURERS.

SIR,—There can be little doubt that overcrowding will never be effectually dealt with until buildings are divided in a way which will render that practically impossible. If the tenant has any choice in the matter, he will be almost sure to seek to reduce his rent by subletting, and thus the evils which it was hoped improved artisans' dwellings would prevent would only be partially mitigated.

From the carefully prepared plans in your last number, by Mr. Mark H. Judge, I am inclined to believe the difficulty may be overcome, and if he were able to avoid the necessity of passing through the back bedroom on the first-floor in order to descend the steps into the yard, I think the plans would be singularly complete. I would venture to recommend the advantage of introducing a current of external air through a channel, either in the wall or flooring, to an aperture situated about 3 in. above the level of the back hearth beneath the stoves. He will thus avoid smoky chimneys and draughts during the winter season when fires are burning, and in the summer these channels will materially assist to ventilate the apartments and keep them cool, and the expense will not be more than a few shillings.

CIVIL ENGINEER.

WOOD-CARVING IN ENGLAND.

SIR,—The thanks of the wood-carvers are due to you for giving them an opportunity of discussing the deficiencies of their art; and while our best wishes are with those gentlemen who are generously endeavouring to encourage the practice of the art, we yet think their method of doing so is open to doubt. Their school for teaching wood-carving cannot be a necessity, seeing the number of clever carvers who, for want of patronage, leave the profession for more remunerative occupations. This is a fact to which Mr. Wallis points, and which the students would do well to remember.

Mr. Rogers (very naturally) speaks of the necessity of master-carvers and designers; they may be indispensable to most occupations, but they are a stumbling-block to the carver, and level him to a mechanic. Mr. Rogers also says,—The carver should be able to carry out any design, and the designer should understand every style. But how could a carver execute properly any design unless he thoroughly understood the style? Then where is the necessity for the designer? The fact is, a proficient carver should, and does, make his own design.

Mr. Wallis says,—Surface is everything. This, if not absolutely true, at least has sufficient truth in it, as regards carving, to show that the professional designer is not required. The carver is master of the surface, and that gives the outline.

Another of your correspondents says work has been sent to Paris because it could not be properly executed in London. Does anybody believe this? Then let him call at 155, Buckingham Palace-road, where he will find a carver who will be pleased to convince him of his error.

R. BAKER.

SHOPS FOR TRAINING APPRENTICES.

SIR,—Whilst the *dilettanti* are assuming that the English craftsman's skill is inferior to the foreigner's, and are, by their disparagement of his powers, bringing the world to believe in this disparagement, I will venture to assert that he is, in the aggregate, unrivalled, and ahead of the rest of the world, and that the *status* of the English workshop, which enables the great engineering firms to turn out work of the quality they do, and such work as may be seen in Messrs. Thorneycroft's torpedo boats, does not in the slightest degree justify either State or Guild interference with its organisation. In some large establishments, the apprentice may possibly not get all the attention one could desire; but this is inevitable. It is the smaller factories which are the real "nurseries" for rearing the best workmen. The large firms I have alluded to must get the very best of workmen, or they could not turn out the work they do, and these workmen must have been properly trained somewhere in this country. If the supply of such workmen were really falling off, and insufficient to meet the demand, we should expect that a number of firms would combine, in certain localities, and establish "apprentice shops" having an organisation somewhat of the following kind:—The firms would appoint a first-rate workman at a liberal salary, as foreman to the "shop," and, let us say, some dozen good workmen as his staff. They would furnish it with the necessary "plant," fix the number of apprentices to be taken, &c. The said firms would also take care that the shop should be supplied with work to keep it going, and in all probability to render it self-supporting.

There is an advantage in the *private* workshop. The *public* technical institution, and all that is done in it, can be studied and copied. You cannot gain a march upon the rest of the nations in workmanship by multiplying institutions of this kind, for they can do the same. If we teach science wholesale, they can teach science wholesale. What we are publicly taught, they can be publicly taught. A public factory cannot keep an advantage to itself, but a private one for a very long period can. Therefore, either State or Guild workshops, if the policy of establishing them could for a moment be admitted to be in other respects good, and their efficiency supposed to be possible, would serve chiefly as patterns for improving the foreigner. I do not say but what this is a very noble and generous policy, but it is not the kind of policy which the promoters of these and allied schemes propose to accomplish by the establishment of such institutions.

I have spoken of engineering because it may be considered representative of the highest kind of mechanical skill, but what I have said in respect to engineering is equally applicable to other crafts. For the above and other reasons I again repeat the warning,—Beware of meddling with the English workshop.

W. CAVE THOMAS.

FIREPROOF FLOORS.

SIR,—In your impression of December 13, I notice Mr. Lascelles disclaims any knowledge of the contents of Mr. Hyatt's book. I would recall his memory to the general conference of the Royal Institute of British Architects, which took place in June, 1878. At one of the evening meetings, at which, as Mr. Lascelles says he was present, Mr. Arthur Cates, Fellow, read a paper on Concrete and Fire-resisting Constructions. Numerous modes were described and illustrated by diagrams; amongst these Mr. Hyatt's method was shown by enlarged drawings from his book, which was particularly mentioned by Mr. Cates as "the most recent and, in some respects, probably the most important contribution to the literature of fire-resisting construction." Especial attention was drawn to the numerous experiments Mr. Hyatt had made, and Mr. Cates concluded his remarks by saying that the brief summary he had made of Mr. Hyatt's treatise was "sufficient to show its value and importance, and to suggest the expectation that experiments so well conducted will be renewed and further important results obtained." I may also add that the council of the Institute thought so highly of Mr. Hyatt's mode of construction that they reproduced some of the illustrations from his book in their Sessional Papers, 1877-78, No. 16.

FAIR PLAY.

*** Without entering upon this dispute, we may mention that we have been called upon several times by a working plasterer and concrete-man to state that Mr. Hyatt, in his inventions, was much indebted to him, the said concrete-man. Our pages, however, are not the proper place in which such assertions can be rightly sifted and settled. We have learnt to doubt the originality of everything. Whether it be a good saying or a mechanical invention, it can always be taken back farther than the reputed originator. Sometimes, like Topsy, we "speckt it growd."

ORNAMENTAL MATERIALS.

SIR,—In reply to Mr. Thomas Barnes, the architectural use of different kinds of quartz for both external and internal ornament is rapidly increasing in North America, especially where, as in California, the lovely rose quartz in great variety is found. There, also, large deposits of calcic carbonates of every colour, and great uniformity in the limestone beds, afford marbles for highly decorative effects. That the employment of the many forms of insoluble silicates in building should be confined to the limited use of common flint, is probably on account of the rare occurrence of sufficient quantity for practical quarrying; but undoubtedly, as pointed out by Mr. Barnes, enough of such mineral deposits exists for really permanent and exquisite mural covering, uses better appreciated by the ancients for such materials as chalcedony, agates, &c., than now.

WALTER H. COFFIN.

EPPING FOREST.

SIR,—There appears to be some misapprehension respecting the so-called appointment of Mr. Alexander Mackenzie to the post of superintendent of Epping Forest.

The facts are simply these. The Epping Forest Committee have the power of appointing officers subject to reporting to the Court of Common Council, whose approval, as well as that of the Ranger, is essential to the validity of such appointment.

The report of the committee is now before the Court of Common Council, and should it not be adopted (which is quite possible) the appointment must fall to the ground, and the whole matter, in this case, will be referred back to the committee to make another appointment, which, in its turn, will have to obtain the approval both of the Court and of the Ranger in order to be valid.

VIGILANS.

COSTUME OF WORKMEN.

SIR,—As one of a very numerous class (a joiner) in the building trade, I was greatly interested in reading the article headed "Costume, Customs, and Diseases of Building Workmen," in your issue of last week.

I most cordially agree with the writer that what is conducive to our skill, as workmen, and also our health, is of the first importance. In reference to that portion which says, "but your modern workman is a gentleman, and does not care to exhibit any of the signs of his trade outside the workshop, and acts in a manner as if he wished that nobody should recognise that he was a mechanic," from my experience and observation I contend society in this country rather than the individual mechanic is to blame, as the mechanic,—the "workingman"—is held to be an inferior being to the most humble clerk, messenger, or porter; and were we to exhibit a tool-basket or any of the signs of our trade, we should not be eligible residents for genteel localities, and I might almost say respectable society, as the remark is so common, "He is only a carpenter." After five years' residence in the United States, I am pleased to state that a different feeling exists in that country.

T. P.

ABSORBENT BRICKS.

SIR,—Can any of your readers inform me what is the average quantity of water which a good kiln-made red brick should absorb if totally immersed for twenty-four hours?

J. N.

ARCHITECTS' DUTIES.

SIR,—Your correspondent "X. Y. Z." inquires whether it be part of an architect's duty to his client, in return for his five per cent. remuneration, to see that the rooms of the building which is being erected under his superintendence are of the agreed measurement, or to climb the roof in order to examine the slating, gutters, &c.

In my opinion, it is decidedly part of an architect's duty to do these things, whether his remuneration be one per cent. or five, and whether a clerk of works be or be not employed.

An architect should not only "check the slating," but he should see the slates before they are fixed, examine the nails with which they are fixed, test the lap and examine the eaves-course, see to the fixing of the cut slates at hips and valleys, and take particular care that the ridging, if of slate, is properly bedded and fixed with a sufficient number of long brass or copper screws.

With regard to the gutters, he should test the substance of the lead used, and see to the drips and falls; examine the cesspools, and see that they are of the required size, and have proper outlets. He should examine the eaves-gutters, and see that they are strongly secured, well up under the slating, with a fall to the outlet, or perfectly level, as may be required; and he should see that iron eaves-gutters are painted on the back before fixing, and inside and out, side after fixing, and that no wood or cement stop-ends are used.

In like manner should the architect's attention be given to all the minute details of the various parts of the building, from the lowest drain-pipe to the highest chimney terminal.

I do not say that failure to discover any particular defect in the work could be regarded as proof of negligence, but an architect who undertakes the superintendence of works for money holds himself out as a man of skill and technical knowledge,—an expert in building,—and if he fails to bring to bear upon his work due and reasonable care and skill, he fails to earn his fee, and probably renders himself liable in damages to his employer.

"X. Y. Z." assumes that the duty of the architect is merely to take a general view of the premises, and for the rest accept the assurance of the builder that the work is properly done. I fear this view is too generally accepted and acted upon by architects, and the result may be seen in the contempt with which the public regard the practical knowledge of the profession, and the difficulty which is experienced in getting builders who are in the habit of working under even eminent architects to do fairly honest work.

C. H.

THE VENTILATION OF GAS-BURNERS.

SIR,—I have read the remarks of "F. N." on ventilating apartments from gas fumes with some interest. So far as middle-class houses are concerned, it seems the principal nuisance to get rid of. It is evident to any one taking notice of the matter that it is only at night, when gas is being burnt, that an oppressive atmosphere exists. During the day rooms are fresh enough, and no one complains. Dr. Arnott's ventilators are well enough so far as they go, but I have found in practice that unless the valve is taken out, no effective ventilation can be obtained either in large or small rooms. The Doctor did not invent the inlet into the chimney; he only proposed putting a valve in it to prevent puffs of smoke issuing into the apartment. This valve prevents nine-tenths of the gas fumes from escaping, and, after all, is but a clumsy expedient in stopping the puffs, which is effectually done by having an opening over the door between the room and the lobby. The puffs are occasioned by the shutting of the door causing a momentary vacuum in the room, and as a vacuum will fill itself from the nearest available supply, the opening above the door is drawn upon in preference to the chimney inlet. Cornices on the door outside and inside hide the hole, which should be the whole breadth of the door, and not less than 2 in. deep. With this provision Arnott's valve may, with safety, be taken out of the inlet, and the relief from gas-fumes will be marked. While a very great improvement will be experienced by adopting these two simple and readily-made suggestions, I believe no apartment can be kept quite free from the products of burnt gas unless there be devised a plan to conduct them from the burners direct to the chimney. I am aware this has been accomplished, but have not seen it made use of in private houses, where appearances usually prevent the adoption of plans of sanitary utility. One thing is certain, branching chandeliers are not suited to deliver their fumes direct into the chimney. Something else will have to be adopted, however odd in appearance. Nothing should be called ugly which effects a good purpose, unless something better looking can be got to work the same end. Some time ago I visited a public library in one of the midland towns, and found a plan adopted which effectually conveyed the gas-fumes to the chimney and worked quite a sanitary reformation in the establishment. The visitors do not now pant for fresh air, and the books in the upper shelves do not rot with heat and sulphurous acid, which before badly affected books and visitors alike.

W. M.

SIR,—"F. N." infers that some means have yet to be discovered for drawing away the products of combustion and heated air arising from the gas in sitting-rooms, and at the same time ventilate the apartment. It will, no doubt, be satisfactory for him to know that such means are already in existence, and are now in use in almost as perfect a form as can possibly be desired.

Had "F. N." visited the Exhibition of Sanitary Appliances lately held at Croydon, he would have seen a large plan exhibited by Messrs. Robert Boyle & Sons, the well-known ventilating engineers, showing their complete system of ventilation as applied to a dwelling-house. What I consider one of the important parts of their system is the arrangement they have for drawing away the products of combustion and heated air directly from the gas and preventing them from mixing with the air in the room. This is effected by means of double pipes, with cones at their lowest extremities placed on the lights, the space between the pipes being packed with a non-conducting substance to prevent them from acting as heaters instead of coolers of the air, as was found to be the case when the single pipe was used.

This in itself is a great stride in the right direction, as the principal objection to the use of these pipes for this purpose was their heating power, causing them to be very soon removed when applied, the cure being found to be worse and more intolerable than the evil sought to be remedied.

I can mention several buildings where they had to be dispensed with for this reason. Great credit is due to Messrs. Boyle & Son in thus effectually and simply overcoming this difficulty, as, though I have considerable experience in these matters, I never heard of the plan being known, or in use anywhere before they applied it. These tubes are gathered together into a main tube which encases the centre pipe of the gasolier, and is carried up through the perforated ceiling-flower into the ventilating-shaft, which is led between the joists to the wall, up which it is carried, terminating at the roof in one of Messrs. Boyle's air-pump ventilators, which, creating a powerful up-draught, constantly draws away the heat and at the same time the vitiated air from the apartment, through the ventilating centre-flower. With this system applied, and proper provision made for the admission of a supply of fresh air, which is also provided for in their plan, I do not see why the air in our apartments should not be as healthy and invigorating as that out of doors on a summer's day. These tubes, instead of being unsightly and proving an eyesore, are so arranged as to appear rather ornamental than otherwise, and the public would very soon get accustomed and reconciled to them even in their plainest form after being in use a little time and the benefits realised.

Lastly, this system has the three essential qualifications which "F. N." considers as necessary, viz.:—(1) Simplicity in construction and application; (2) self-acting in every part; and (3) non-liability to get out of order.

W. G.

Hereditary Tendencies in Health and Disease.—The sum of 200*l.* has been offered by the Rev. E. Wyatt-Edgell, through the Sanitary Institute of Great Britain, for the best essay that may be sent in by the 1st of August next on "The Cause of Hereditary Tendencies in Health and Disease."

THE NEW HAYMARKET THEATRE.

SIR,—As there are some novel and important features in the fireproof work of the new Haymarket Theatre, we shall be glad to be allowed to add some information to that given in the last number of the *Builder*.

The partition dividing the auditory from the stage end of the theatre, to the full height and width of the building, instead of being lathed and plastered or boarded, has been made fireproof by the use of our fireproof concrete slabs; and the doors in this partition are also of fireproof concrete, the object being, in the event of a fire, to isolate it to one part of the building, and thus prevent it from spreading to the other part.

The whole of the fireproof work, including floors, has been executed by us, under the direction of Mr. Phipps, as a separate contract.

CHARLES DRAKE & CO., Limited.

THE COST OF TENDERING.

SIR,—In your issue of the 22nd Nov. an advertisement appeared inviting tenders for a new mortuary for the Vestry of St. Matthew, Bethnal-green, and stating that copies of quantities could be had on payment of 10s. 6d.

We applied for and received the quantities, and sent in our tender, but were not successful. We subsequently wrote for the half-guinea deposit to be returned, and received the following letter in reply:—

"December 18, 1879.

Re MORTUARY.

Gentlemen,—The 10s. 6d. left by you for the bills of quantities was an actual payment, not a deposit.—Yours faithfully,

JNO. A. SHARP,
Assistant Surveyor to the Vestry."

We wrote again, pointing out that this was an unfair and unusual course, and stating that we should draw attention to the matter if the deposit were not refunded. To this we have received no reply.

Surely, in these days of competition, when every new job is so hotly contested for, it should be enough for the contracting parties to have the benefit of a number of business men's time and necessary expenses without making a charge.

There were twelve tenders sent in, ranging from 1,995*l.* to 1,376*l.*, and we should be glad to learn to whom the twelve half-guineas went. The usual surveyor's commission was allowed for, and also the customary fee for lithography: to whom, then, did the money go?

If to the corporate vestry, we, for our part, are sorry they should be so hard up as to raise money by such means.

It may be urged that in the advertisement the wording was,—"Tenders will be furnished on *payment* of 10s. 6d.," but the wording is also similar in the advertisement for new labourers' cottages at Putney (*Builder*, Nov. 29th), but they returned the deposit as a matter of course.

We wish to draw the attention of builders especially to this trick, as it seems to us like the insertion of the thin end of the wedge, and may develop into a process for raising money at the expense of a number of business men. Builders are quite weighted enough already without the incubus of a fee for the privilege of tendering for an uncertainty.

It does not appear to strike some people that the cost of preparing a tender is considerable, besides entailing a large amount of personal trouble on the principal.

It may appear that we are making a great fuss about half a guinea, but unless some one points out these innovations they are apt to become accepted customs.

LUCAS & SON.

ROARING WATER-PIPES.

SIR,—On casually looking over the *Builder* for October 25th, 1879, I came across a complaint respecting the "roaring of water-pipes." Your correspondent writes: "I have applied to the Vauxhall and Southwark Company that supply this district, but to no effect: it seems beyond their comprehension." From my long experience in hot-water engineering, I should attribute the noise to the presence of confined air in the pipes, especially as your correspondent had a pipe burst in his kitchen. If my theory be correct, a re-arrangement of the pipes, so as to obviate any "dips" after once starting from the main, and keeping the discharge-end higher than any other portion, would probably remedy the nuisance.

H. HOWLETT.

LIFE BUOYS.

SIR,—Another great loss of life at sea! Although it may seem hopeless ever to construct a ship which shall be absolutely unsinkable, can nothing be done to save passengers and crew, even for a time, when a ship goes down? I think something may be done, and I entreat you to insert this letter in the hope that the suggestions I am about to make may lead to some really practical results. Early this year the Society of Arts invited suggestions for life-saving apparatus which could be easily stowed on ships. I then suggested what would occur to most people, viz., a larger number of life-buoys. These, however, were to be stowed in two metal cylinders, open at the bottom, and of a slightly larger diameter than the life-buoys. These cylinders were to be placed vertically on the inside bottom of the ship, and to pass upwards through the several decks, so that if the ship were to fill with water the buoys would be forced out at the tops of the cylinders and float upon the sea after the ship had gone down. The life-boys should be connected together in groups of say four or five by means of cords, so that, when extended in the water they would appear thus:—o—o—o—o—o. In the centre of each group instead of a life-buoy might be placed a tin case, hermetically closed, and containing a store of provisions or any articles which would be useful to persons drifting about in the open sea, such as a compass, rockets, flags, tools, medicines, &c. As there would be a number of these tin cases in each of the proposed cylinders, a different assortment of articles might be contained in

each. The tops of the cylinders would project slightly above the upper deck, and would be covered with caps to protect the life-buoys from the weather. A pair of these cylinders, placed respectively fore and aft in a ship, would take up but little room, and would contain a sufficient number of life-buoys to save the lives of all the passengers and crew. Of course a few life-buoys should also be kept at the usual places to throw to any one falling overboard.

CHARLES STEWART, M.A.

COPYRIGHT OF TRADE CATALOGUES.

CHUBB AND SONS *v.* COTTERILL.

THIS was a motion for judgment (Chancery Division), the defendants having been restrained by injunction from publishing the copyright illustrations and letterpress of the plaintiffs' trade catalogue of locks and safe rooms.

The plaintiffs are the manufacturers of Chubbs' locks in the City, and for the purpose of promoting their business they published catalogues, which contained drawings of articles manufactured by them, accompanied by letterpress. There were several editions of the work, the last of which was registered in July, 1879. The defendants were also manufacturers of locks, keys, safes, strong rooms, and other articles, and they published in June, 1876, books of designs, entitled "E. Cotterill & Co.'s unpickable and powder-proof acme and climax locks," with descriptive letterpress. The designs and letterpress were similar to those in the plaintiffs' catalogue, and it was alleged, were in many instances distinct copies. The plaintiffs averred that these books were of great value to them, and by the publication of the defendants' trade lists they had sustained damage. The Court, when the case was heard before the long vacation, restrained the defendants from issuing or circulating any more of their trade lists till the hearing of the action.

Mr. Short, who appeared for the plaintiffs, now asked for judgment and costs, as the defendants consented to the adoption of that course.

Order accordingly for judgment, as asked, with costs.

LANDLORDS' LIABILITIES.

CUTLER *v.* MANTELL.

THIS was an action (heard before Mr. Justice Fry in the Chancery Division on the 16th ult.) to set aside an agreement for the lease of a house at Hanwell, on the ground of misrepresentation in the matter of drainage and water supply, and for consequent damages. The defendants are three gentlemen who are entitled to equal interests in the premises,—namely, Mr. E. W. Mantell, retired architect, and Mr. A. F. Goodson, and Mr. W. C. Russell, the one a barrister, the other a solicitor.

It appeared that early last year negotiations were entered into between Captain Cutler, the plaintiff, and a Mr. Hill, a house agent at Hanwell, with respect to the letting of the house. The house was not in Mr. Hill's hands, but his lordship thought his agency was adopted. Mr. Hill stated, in reply to a question by Captain Cutler on the subject, that the house was drained into cesspools; but on the 22nd of March, 1878, he wrote to Mrs. Cutler as follows:—"When I met Captain Cutler to-day in the City I was in error when I stated that the drainage is into cesspools. It seems that the drainage from the house enters the main drainage in the road, and, I believe, is partly or entirely discharged into the river Brent. Mr. Mantell states that no drains go under the house." Mrs. Cutler, during the negotiations, wrote a long letter to Mr. Mantell, inquiring specifically as to many matters about the house, and stating that there had been illness and death in the house, caused by bad drainage, and they were naturally anxious on the subject of drains. Mr. Mantell wrote an answer dealing with her questions in detail, and stated, among other things, "There are no cesspools on the premises"; "the closets are supplied from a separate cistern to that for domestic purposes." Captain Cutler eventually took the house, and some of his family went into possession on the 30th of September, 1878. In October one of his children died in the house, of diphtheria, and his sister-in-law died early in November of the same complaint, also on the premises. He removed and brought this action, alleging, by his statement of claim, that he was induced to take the house by the representations made in the two letters above referred to, and that the representations were false. It turned out, according to his lordship's view of the evidence, that at the time of the bargain the drainage of the house was in a transition state. There were some old cesspools on the premises which had been disconnected from the house. There was still in use a cesspool, not on the premises actually occupied with the house, but under a piece of land over which there was a right of way; this was connected with the new drainage. His lordship considered this cesspool on the premises, even in a strictly legal meaning of the word, as being appurtenant to the use of the house. There were two cisterns in the house, one of which, besides supplying more than one water-closet, supplied all the water for domestic purposes.

The defendants denied misrepresentation and the agency of Hill. In order to show that diphtheria could not have arisen from any imperfection of drainage, they called Dr. Semple, a member of the College of Physicians, who had made diphtheria a special study. He reiterated a statement contained in his published work, that "locality appears to have no influence upon the organisation or the disappearance of the disease. The weak and the strong seem to be pretty equally liable to its attacks, and the want of sanitary precautions does not tend materially to develop its presence, nor do the most carefully-devised hygienic precautions prevent its appearance."

Mr. Justice Fry, in giving judgment, said that the defendant, Mr. Mantell, had made statements (he was happy to say he believed not knowing them to be untrue) which ought not to have been made in answer to such inquiries as were made, and in such circumstances, without his informing himself of the truth of them. He might have given instructions as to alterations of the premises, but it was his duty, and not the less so because he was an architect, to have known what the circumstances were. The other defendants had left the matter in his hands, and, therefore, no damages could be given against them. His Lordship gave judgment for rescission of the contract, and directed an inquiry as to damages against Mr. Mantell.

ARCHITECTS AND CORPORATIONS.

SIR,—In your issue of December 27 I observe the report of a case tried at Liskeard County Court,—The Talland School Board *v.* Trevail,—in which the judge held that though the jury found a verdict for Mr. Trevail, he could not succeed in the action because the contract with the School Board was not under seal. In my recently-published "Digest of Building Cases," I have given the decision in Hunt *v.* The Wimbledon Local Board, in which this same point as to the corporate seal was decided by the Court of Appeal. I have no doubt, however, in spite of the warning which, as I pointed out in my notes to this decision, Hunt *v.* Wimbledon Local Board contains for architects, that there are many agreements still made by architects with Corporations on which they would be unable to obtain redress if they were to proceed against the Corporation, for want of the corporate seal being affixed to the contract. Nor is it very unreasonable that architects should often omit to secure themselves against such a technical and in many cases immoral defence as this. Therefore I venture to suggest that if a note, warning architects to be careful on this point, were inserted in the rules issued by the Institute as to architects' charges, it might often keep the latter from neglecting this important point. I am now, let it be observed, not making any observations on the judgment of the Liskeard County Court, but assuming it to be correct, it shows again the necessity for caution in dealing with corporate bodies.

Temple. EDWARD STANLEY ROSCOE.

A DOUBLE-ACTION SOIL-PIPE VENTILATOR.

MESSRS. ROBERT BOYLE & SON, of Glasgow and London, the well-known ventilating and sanitary engineers, have, by a combination of their air-pump ventilator and a down-cast ventilator, also patented by them, produced a soil-pipe ventilator which appears to answer very well. The upper portion of it consists of the air-pump, or extracting ventilator, connected with the up-cast ventilating-pipe. The down-cast ventilator, forming the lower portion, communicates with the soil-pipe. From the arrangement of the plates or division, it presents an open mouth (on the principle of the wind-sail) to the wind, from whatever quarter it may blow, forcing it down the soil-pipe and up the ventilating-pipe. By this means a double-power is obtained, the force of the wind driven down, and the suction of the extracting ventilator, keeping the soil-pipe perfectly free from poisonous gases. This ventilator has also the merit of being a fixture, with nothing movable to get out of order or make a noise. The fact of the air inlet being at such an elevation, insures a supply of air, and a force not attainable at a lower level.

Both pipes may be placed inside the house or outside as preferred; or the soil-pipe may be fixed inside to protect it from frost in the winter time. There would not be the slightest danger, however, in having it in the house with the double-action ventilator applied. It is placed in preference outside, so that the up-cast pipe may have the benefit of the heat in the house, which tends to rarify the column of air, and which also derives a greater velocity from the colder and heavier air in the outside pipe rushing towards it and forcing it out at the top.

A 2-in. ventilating pipe is introduced connecting the drain with the up-cast pipe, where no provision is made for ventilating the drains separately.

Mr. R. P. Beattie, plumber and sanitary engineer, Edinburgh and London, has used these double pipes very extensively, and we understand they have been found to answer well.

Paving in Bethnal Green.—The Bethnal Green Vestry have lately decided to spend 13,000*l.* in street paving.

CHURCH-BUILDING NEWS.

Great Sutton.—The newly-erected church of St. John-the-Evangelist, at Great Sutton, which is an outlying part of the parish of Eastham, has been consecrated by the Bishop of Chester. The new church provides accommodation for about 250 worshippers, and consists of a nave, a large chancel, with vestry and organ chamber, a south porch, attached tower and angular spirelet, which rises to a height of 65 ft. The building is constructed of Minera stone in corniced shoddy walling, with dressings of Stourton stone, all the internal features and dressings being also of the latter material. The roofs are covered with silver-grey slate, from the neighbourhood of Machynlleth, and are surrounded by a red ridge. The whole of the roof timbers, which are open, are simply dead-polished, and also the pitch-pine seating. The flooring under the seats is constructed with wood-work paving in patterns, the aisles and chancel being paved with Godwin's encaustic tiles. The nave windows are in varied tints of Hartley cathedral glass, from the architect's design; the east end and chancel memorial windows being filled with stained glass from the studio of Messrs. Mayer, of Munich. The font is also of Caen stone and marble, and has been executed by Mr. Rogerson, of Liverpool. The church is heated by hot air, and lighted with gas, the fittings being supplied by Messrs. Freeman & Collier, of Manchester. The contractors for the entire work were Messrs. Tomlinson, of Leeds and Chester. The building was designed, and the erection superintended, by Mr. David Walker, architect, Liverpool.

Beckermont.—The new church at Beckermont has been consecrated by the Bishop of Carlisle. Mr. J. Bintley, of Kendal, was the architect, and Mr. John Smith, Egremont, the contractor for the church, which is Gothic in style, and will seat 250 worshippers. The contract for the building was 2,000*l.*, but the total cost has been 2,300*l.*

Bradford.—The new Christ Church, Eldon-place, Manningham-lane, has been consecrated. The plan of the church has been specially adapted to the site, the principal doorway being in the north transept, and another doorway, with south porch, being planned adjoining the secondary entrance from Hallfield-road. The entrances are well screened by double doorways and inner porch enclosures. The ground plan consists of a nave, 90 ft. by 25 ft.; north and south aisles, 62 ft. 6 in. by 13 ft. 6 in.; north and south transepts, 23 ft. by 20 ft.; an apse-ended chancel, 30 ft. by 25 ft.; choir vestry, 17 ft. by 16 ft.; and clergy vestry, 11 ft. by 11 ft. The nave is divided into four arches on each side, supported by clustered stone pillars, 2 ft. 3 in. in diameter; and moulded arches springing from stone corbels separate the transepts, the chancel, and the organ-chapel; and all these, as well as the internal finishings of the doors and windows, are in Corsham Down stone. The internal height of the church from the nave floor to the ridge of the roof is 51 ft. 6 in. The seats are in pitch-pine, and the roofs throughout are open, with hammer-beams to the principals, supported on corbels, and boarded with dressed boarding. The warming is by Messrs. Haden & Sons' apparatus. The exterior of the church is plain. The style is Early English, with a few features of Early Decorated character. Foundations have been laid for a tower and spire at the north-east corner of the north transept, but at present the roof has been put on at a height of about 20 ft. from the ground. The masons' work has been done by Messrs. Charles Booth & Son, of Clayton; the joiners' work by Messrs. Marsh, Jones, & Cribb, of Leeds; the plumbers' work by Messrs. Haigh & Slater; the plasterers' work by Mr. B. Dixon; the slaters' work by Messrs. Hill & Nelson; and the painters' work by Mr. James Lynn. The carvers' work and the pulpit have been done by Messrs. Farmer & Brindley; and the organ has been built by Messrs. Conacher & Co., of Huddersfield, under the supervision of Mr. J. Rhodes. The entire cost of the church and site, exclusive of donations, has been about 11,250*l.* Mr. John Wilson has acted as clerk of works, and the architects are Messrs. W. & R. Mawson, of Bradford.

Bishop's Fonthill.—The Church of All Saints, Bishop's Fonthill, Wilts, was re-opened on the 17th ult., after restoration. The works have included the raising of the tower, roofing anew the whole church, casing the north and west walls, rebuilding the east and west walls of the

north transept, and the insertion of a two-light window in the west wall. The entire work has been executed under the superintendence of Mr. W. L. Spiers, assistant to Mr. T. H. Wyatt, by Mr. W. Crook, of West Dean.

DISSENTING CHURCH-BUILDING NEWS.

Burslem.—Hill Top Chapel, Burslem, has been re-opened, after structural alterations which have cost about 600*l*. The works were executed from plans prepared by Mr. A. Wood, architect, Burslem.

West Hartlepool.—Mr. I. L. Bell, M.P., has just laid the foundation-stone of the new Presbyterian Church, near the Skating Rink. The new building is to be of brick, in the Gothic style, with stone dressings, and a spire rising 122 ft. high. Including galleries, it will accommodate about 600 people. Mr. James Garry, of West Hartlepool, is the architect. The church will cost about 4,000*l*.

Northampton.—On the 21st ult. the new school chapel for the Primitive Methodists, situate on the Kettering-road, was opened. The large chapel is in course of erection by Mr. Cosford, of Northampton. The room now opened measures 41 ft. 6 in. by 41 ft., and will accommodate upwards of 350 adults. The heating apparatus is supplied by Messrs. Trusswell & Holden, of Sheffield.

Liverpool.—A new Primitive Methodist Church and schools are about to be erected at the corner of Smithdown-road and Earl-road. The new chapel is intended to accommodate 700 to 800 persons. The cost of the site is 850*l*.; and the building,—according to the present plans, which have been prepared by Mr. Morry, architect, Manchester,—will cost about 2,500*l*.

SCHOOL BUILDING NEWS.

Nuneaton.—The new Nuneaton Grammar School, erected not far from the site of the old school, is built in the style known as domestic Gothic, in red brick and half-timbered work. The architect was Mr. Clapton C. Rolfe, of Reading. The contract was taken for 3,500*l*. at the beginning of last year by Mr. Thomas Smith, of Nuneaton, who has not only built the schools, but all the bricks and tiles used upon the premises were made by him too. Red bricks are used generally, interspersed here and there with courses of Bath stone; a deep moulded plinth, which runs along the basement, is in dark blue brickwork. The dressings are all of Bath stone, and the various label stops are carved. The roofs are of steep pitch, covered by red tiles. Standing upon a moulded stone corbel, and protected by a canopy, at the junction of the school and master's house, is a statue, nearly life-size, of the youthful founder of this grammar school, King Edward VI. It is in Ketton stone, and is the handiwork of Mr. Harry Hems, of Exeter, who has also executed all the ornamental carving upon the building. The foreman of the works was Mr. Chitham.

Halifax.—At the last meeting of the Halifax School Board, it was resolved that Messrs. Leeming & Leeming be instructed to prepare plans for a school at Lee Mount, to accommodate 650 children in three departments, viz.:—225 boys, 225 girls, and 200 infants, the cost not to exceed 4,500*l*., exclusive of formation of playgrounds, erection of boundary-walls, gates and railings, and furniture.

STAINED GLASS.

Lochmaben.—As the result of a subscription promoted by the Rev. W. Graham, Newhaven, there has been provided for the Town-hall of Lochmaben a stained-glass window, commemorative of Sir William Wallace, and intended as a companion to the "Bruce" window placed there some time ago. The work has been designed and executed by Messrs. Ballantine & Son, Edinburgh.

Great Yarmouth.—A memorial window to the late Mr. E. R. Aldred and Mr. C. S. D. Steward, churchwardens, is to be placed in the south aisle of the parish church next to the Paget memorial. Messrs. Buckley & Co., of London, have been commissioned to execute the work.

Keynsham.—A stained-glass window, by Messrs. Bell & Son, of College-green, Bristol, has recently been placed in the south aisle of Keynsham parish church. The subjects are our Lord's three resurrection miracles,—the Raising of the Widow's Son, of Jairus's Daughter, and of Lazarus. In the tracery are figures of angels bearing scrolls.

Brixton.—A window by Messrs. Shrigley & Hunt has just been placed in St. John's Church, Angell Town, Brixton, in memory of the late Mrs. Cooke, wife of the vicar.

Stanley.—Special services have been held in St. Thomas's Church, Stanley, near Crook, to inaugurate a memorial-window, erected by Mr. J. Douglas, of West Lodge, in memory of his mother. The architecture of the window is Early Decorated, and it consists of three cusped lancets, separated by stone mullions and geometric tracery work under the arch, the whole of which has been filled in with the richest stained glass. The subjects, of which there are five, are drawn from the life of our Lord in connexion with that of St. Thomas, the Apostle and Martyr, to whom the church is dedicated. All the subjects are represented under canopy work. The window, which is erected in the east end of the chancel, is by Messrs. Wailes & Strang, of Newcastle-upon-Tyne.

Halifax.—Another stained-glass window has been placed in the clearstory of Halifax parish church. It is by Messrs. Shrigley & Hunt, of Lancaster, who have also just filled in three lights of the six-light window over the inner entrance of the great south porch. This latter window is given by Miss Knowles, of Wards End. The subject is Elijah in the Desert.

Books.

Elementary Lectures on Christian Architecture. By R. POPPLEWELL PULLAN, F.R.I.B.A. London: E. Stanford. 1879.

THIS small book is, we understand from the preface, a publication of lectures delivered at various times in London and the provinces. We agree with the author that a rudimentary book on architectural style is wanting, but, with all recognition of Mr. Pullan's knowledge of his subject, which is derived from an actual study of the buildings referred to, we fear his book will not teach anything to any one who does not know much already. We presume that when the lectures were delivered they were illustrated by drawings; but there are no illustrations appended to this book of the varieties of plan and style which are referred to; and to talk about such things to un-architectural readers, without showing them in drawings, is simply beating the air: no distinct idea is conveyed to the mind of such an audience by any amount of writing. And the author does not even explain in words some of the most important points on which he touches. For example, we meet with this sentence in regard to Lombard and Teutonic Romanesque:—"The general plan, the crypt, and the apse, came from the basilica; the dome,—which, by-the-bye, seldom occurs,—from the churches of Byzantium. But vaulting was a new element in their composition; it naturally sprang out of an increased constructive skill, and finally entirely superseded the low wooden roof of the basilica. Consequent upon the use of the vault was the introduction of long slender vaulting-shafts, clustered columns, and triforia." The architectural student will scarcely believe that this is literally all the explanation the reader gets about vaulting and its concomitant features. *Why* did vaulting spring out of an increased constructive skill? Wherein was this constructive skill shown? What was the connexion between clustered columns and vaulting? Why did vaulting lead to the introduction of triforia (or rather the development of the triforium, which is the more correct way of putting it)? On all these points the reader is left to guess what he can.

The three first lectures, which aim at characterising the leading varieties of Romanesque and round-arched Gothic, will be of more use to architects than to general readers, as the former can understand them without diagrams, and they form a useful memorandum of the leading characteristics of Romanesque in different ages and countries. After this there is a great gap, and nothing further till we come to a lecture on nineteenth-century Gothic, containing a great deal that is very well put, and in which we quite concur; but the point of the remarks could hardly be appreciated by readers who had no knowledge of the genuine Pointed Gothic, of which that of the present century is a revival; and as they get no information on the subject from the author, it is again difficult to see that this chapter can be of much use to them either. In fact, the title of the book is misleading. To take up a book called "Lectures on Christian Architecture," and to find no attempt to give either history or analysis of the most important and perfected form of Christian architecture, is calculated to puzzle the uninitiated reader, and make the initiated considerably dissatisfied.

The only portion of the work which is illustrated is the chapter on style and proportion in Gothic buildings, appended to which are several diagrams of sections of Gothic buildings illustrating the author's theories as to the proportionment of the heights and widths of various parts of the buildings on the basis of a system of triangulation. Without going here into the often-vexed questions, whether Mediæval works were designed upon such a basis of mathematical proportions, and whether the art of architectural design may or may not be assisted by this process, it may be safely said that Mr. Pullan's diagrams will convince no one who is not predetermined to believe. To illustrate the logical inconclusiveness of his method (if method it can be called) it is sufficient to point to his plate 4, where the underside of the interior angle of the roof principals is determined by a triangle based on the exterior ground-line of the outer walls, the angle of the principals being invisible from any point within or without the building, on account of the intervening stone vault, and the apex and springing of the triangle being in any case incapable of being seen at the same time in the actual building. The rest of the triangulated proportions appear equally without method; in fact, the whole seems to be merely a system of drawing triangles over the section wherever they can be made to fit. Those who require to be convinced that there is something in the system will not take it except on "better security" than this. The remark as to the unsatisfactory nature of the process of designing "in a hap-hazard, undecided manner, by what Viollet-le-Duc calls a "series of *tatonnements*," begs a very large question. What is artistic design in general but "a series of *tatonnements*," to begin with? The sculptor makes a number of rough clay sketches, the painter a number of rough colour sketches, constantly, before either arrives at the development of his idea; and so the architect makes sketches and studies before he arrives at his idea of the best appearance and proportion of his building. He is certainly as likely to get at his object in this way as by assuming geometrical relations between the centre of the floor of the side-aisles and the apex of the vault of the centre aisle. (See plate 1.) What connexion in composition is there between these parts of the building? The centre of the aisle-floor is not a point appreciated by the eye at all in looking at a building; unless, indeed, you mark it by an inlaid line in the pavement to enable the spectator to appreciate the composition. And in plate 4 we perceive that the width between centres of the aisles does not govern the height of the central vault, but that of the centre of the circle in the traceried window at the end of the nave.

We are quite ready to believe that many Mediæval buildings were proportioned on a system of squares or triangles, but Mr. Pullan does not show that he has mastered the system.

The Antiquary: a Magazine devoted to the Study of the Past. Edited by E. WALFORD, M.A.

"IN spite of the fact," says the prospectus, "that this age lives so much in the present, worships progress so keenly, and looks forward to further advancement so hopefully, there is in the breast of our 'nation of shopkeepers' a deep-seated reverence for antiquity, *religio loci*, which shows itself in the popular devotion to ancient art, whether in architecture, in painting, in design, or in furniture, and in the eager reception accorded to fresh discoveries of relics or works of antiquarian interest, and which finds its expression in the hearty and general welcome accorded year after year to our leading archæological societies." The hope of the editor of the *Antiquary* for success is partly founded upon this belief, and we see no reason why he should be disappointed, and we have no doubt he will find many responses to the *envoy* of his prologue:—

> "Friends that we know not and we know!
> We pray you by this Christmas chime
> Help us to save the things that go;
> We are the gleaners after Time."

The first number is a very good one; if that standard be maintained success is scarcely doubtful.

VARIORUM.

MADE into a volume, "Our Own Country,—Descriptive, Historical, Pictorial" (Cassell & Co.), forms a handsome gift-book, and one calculated to show how much there is to be seen in the United Kingdom, full of interest and full of beauty. With a little personal inquiry the writer of some of the chapters could have made them more complete. The book has 200 illustrations.——With the commencement of the new volume of the *Furniture Gazette*, in January, 1880, the publishers announce several important changes in this old-established organ of the furniture and upholstery trades. The art-editorship will be entrusted to Dr. Dresser, F.L.S. Additional illustrations and art-plates will be given, and the scope of the paper will be enlarged so as to embrace art pottery, art metal-work, glass, interior decoration,—indeed, all subjects relating to art-furnishing in its broadest and most comprehensive sense.—— Amongst the newspaper changes for next year it is announced that the *Timber Trades Journal*, which for the last seven years has been published fortnightly, will, on and after January 3rd, 1880, appear weekly.——Even *Brief: the Week's News*, has a Christmas double number, with chromo-lithograph supplement, the aforesaid number containing a host of amusing stories and poems. The amount of condensed information, gathered and original, in each week's number of *Brief* is surprising.——The *Gardeners' Chronicle*, not to be out of fashion, gives a pretty coloured almanack,—floral, of course. The *Gardeners' Chronicle* is admirably conducted, and must be found of great value by a large number of persons.——From the *Magazine of Art* we get a paragraph as to "Wood Engraving."—"The most striking contrast between the cuts of Dürer and those of Bewick consists in the thick outlines which prevail in the former, and the almost total absence of any outlines in the latter. It was natural that Dürer, working with the pen, should proceed with such lines, and equally natural that Bewick, working direct on the wood with the graver, should find no occasion for them; but it would be interesting to know whether Dürer would have developed a totally different execution had he worked on the wood. Some such process as this seems probable. Take a simple case,—he has a tree to draw against the sky. With the pen he would give the leading contours, and then proceed to fill these up with detail, multiplying the lines, or thickening them, according to the degree of depth he required. If he were working on the wood he could not obtain his effect this way. He would first carve the tree as a black object against the sky, and then, out of this black tree (which would look much as a tree does against a low twilight sky, when we cannot distinguish its inner forms), he would cut the lighter portions. It would, of course, be possible to cut these so as to leave lines at the edges, but there would be no necessity to do this, and it can hardly be doubted that in time an artist so working would emancipate himself from the idea of an outline to every object, and would maintain only the sculptured forms, light on dark, and dark on light, using lines only where they are required to express tints."——In the January number of *Time*, which is illustrated with several pages of Mr. Alfred Thompson's clever sketches, the editor, Mr. Edmund Yates, gives a plain, unvarnished account of his quarrel with Thackeray, some twenty-one years ago. He seems to have been provoked to this by the frequent reference to the quarrel occasioned by a more recent Club Scandal.

The Tay Bridge Disaster.—Amongst a number of correspondents who address us too late for publication, Mr. Wentworth Lascelles Scott writes:—"I have no hesitation in declaring my conviction that the Tay Bridge was destroyed mainly because certain of the central girders were urged by the gale into a condition of regular and rhythmic musical vibration, during which the sudden impact of a heavy train upon a ventral segment, at or near the point of its greatest amplitude, shivered such girder near its node, or point of no vibration, the train having a tendency to set up a sway, or another kind of vibration, at right angles, or nearly so, to the plane of the musical vibration which had been accumulating previously; the immense tension-wave set up by the fracture would suffice to ensure the practically simultaneous disruption of the other parts."

Miscellanea.

St. Mark's, Venice.—A correspondent of the *Times*, writing from Venice on the 13th ult., fully corroborates the view expressed in the *Builder* that the alarm as to the proposed works of restoration or reparation at St. Mark's was to a great extent unfounded. He says, "A thorough examination of the Church of St. Mark, with the explanations and in the company of the architect and the directors of the repairs of the mosaics, enables me to assure those who have shown so much interest in the fate of the building that the alarm as to the repairs in contemplation was much exaggerated, but at the same time to satisfy myself that what is proposed is, in the main, actually indispensable, and will in all probability be carried out according to the plans laid before the Commission appointed for that purpose." The correspondent then goes on to detail what has been done and what is proposed to be done by the architect, Commendatore Meduna. He says that, "so far from a general demolition of the façade being intended, the plan of immediate operations consists in removing the veneer and its relative columns of the doorway nearest the south-west angle, the re-facing of the corroded brickwork, and the restoration of the old columns, cornice, &c., to their place, with replacing of such slabs of the veneer as are absolutely unfit for further use."

The Dusseldorf Exhibition of 1880.—The structure in which the exhibition of next year is to be held at Düsseldorf is now, as far as the walls and roofing are concerned, complete. The length of the main building is 1,181 ft., and the area it covers is almost exactly equal to that of the Exhibition Palace at Sydney, New South Wales, or about half the length of the great Exhibition building at Paris in 1878. The workmen are now engaged on the division and fitting up of the interior, and no doubt is entertained that the whole will be in perfect readiness for the opening day, which has been fixed for the 9th of May, 1880. Many of the principal firms are erecting special buildings or annexes of their own. In addition to these 3,000 exhibitors connected with industries, there will be three other divisions devoted respectively to fine art, agriculture, and forest culture. The fine-art department will occupy part of the main building. In the agricultural division there will be no less than eighty-five exhibitors of agricultural machinery alone. One of the most useful departments of the show will be that of forest culture, which is a novelty at an exhibition of this kind, and as Germany is noted as the headquarters for the scientific study and practical acquisition of this branch of culture, much interest will attach to the maiden exhibition of this branch of field industry at Düsseldorf. The agricultural and forestry exhibition will be held in a number of annexes attached to the main building. Krupp, of Essen, is building an extensive special pavilion, which is nearly complete.

The Mersey Tunnel.—In the excavations for the shaft for this tunnel, on the Liverpool side, on Saturday last, the workmen came upon the level of the old river beach, at a depth of some 12 ft. from the surface. The spot fixed upon by Mr. Lyster, the dock engineer, for the site of the shaft, seems to have been the centre of the old Bird-street, which was originally laid out some 150 years ago upon made ground. The *Liverpool Post* understands that as the proposed shaft will probably continue in made ground, sand, &c., before the rock is reached, it is intended to encase it with an iron cylinder. The shaft on the Birkenhead side, near Woodside Ferry, was begun immediately on signing the contract with Mr. Ridley, and has been continued without intermission, being worked with three shifts. It has now been sunk some 40 ft. in the solid rock, with no interference whatever from water.

Enviable.—A great digger, known to all Europe, writing to us last week from Athens, says,—"I am astonished to hear that the winter has set in with you very severe. Here our gardens are full of oranges and flowers, and I have never ceased bathing in the sea all the winter!" If one could hold a fire in the hand by thinking of frosty Caucasus, what a delightful sensation this sentence would confer.

The Late Princess Alice.—Messrs. Clayton & Bell are engaged in producing for the east end of Christ Church, Eastbourne, a window in stained glass, which is to form a memorial to the late Princess Alice.

New Temple at Moscow.—The Kram Spassetelya, or Temple of Our Saviour, at Moscow, is now rapidly approaching completion. The building was begun so far back as 1833, and was designed in commemoration of the French expulsion from Moscow. Nearly 4,000 labourers, for a month, were employed in digging out the ground for the foundations, and considerable energy was displayed in building the base; but, after a while, operations languished, and the work has gone on by fits and starts, until it has now reached a stage when the architect can promise its completion next August, in readiness for the twenty-fifth anniversary of the Emperor's coronation. The height of the structure is 288 ft., and the style of the architecture is the Russo-Byzantine, the building being in the form of a Greek cross, surmounted by five cupolas, one at each corner, and a large one, or dome, in the centre. The roof and the framework of the cupolas weigh 1,800 tons, and the gilding on the latter has already consumed more than half a ton of gold-leaf. Above the centre cupola is a massive bronze cross, which can be seen from every part of Moscow. The bronze frames of the windows, each 27 ft. high, weigh nearly 3 tons, and the hinges of the bronze doors have to support 5½ tons of metal. Inside, the walls are gorgeously decorated in the usual style of Russian churches, and contain a number of jasper pillars, each of which cost upwards of 2,000*l*. The total cost of this wonderful building is estimated to exceed 20,000,000 roubles, or 2,500,000*l*. sterling. But this is not all. Recently the architect reported that a block of houses in proximity to the temple was detrimental to one of the aspects, and, as a mere matter of course, the Synod voted 200,000*l*. to demolish the buildings, and to construct in their place a terrace. A cathedral, not quite so large, is also rising at Nijni Novgorod, and will involve an outlay of 2,000,000*l*. sterling before completion.—*Parisian.*

Red Bricks.—We are asked by Mr. Lawrence, of Bracknell, to say, that the whole of the facing and cutter bricks used at the house on the Chelsea Embankment recently illustrated in our pages were supplied by him, and not from Fareham. We know perfectly well that Mr. Lawrence is one of the largest makers of red bricks within seventy miles of London, and a capital maker too, but when informed by the representatives of the builders on the works that the bricks used were from Fareham we must be excused for not stating they were from Bracknell.

The New Eddystone Lighthouse.—Work on the new lighthouse at Eddystone has been suspended for the present. The circular area on the south reef, enclosed by a massive dam, as the site of the new tower, is now almost covered by stonework in position, and within six months it is hoped that the basement of the building will be above high water level. It is considered that in preparing the foundation, most of which is some feet under water, and bringing the stonework to its present height, the engineers have completed the most difficult portion of the undertaking.

Great Fire at Boston, U.S.—Amongst the calamities which have marked the close of the year 1879 is a great fire which broke out in Boston, Massachusetts, on Sunday last, Dec. 28th. The fire is reported to have caused immense damage to property in Devonshire and Federal streets. The stores of Messrs. Houghton, Osgood, & Co., publishers; Messrs. Rice, Kendall, & Co., paper dealers; the North Bank; and many other establishments were destroyed, the losses being estimated at $1,000,000. The conflagration extended over part of the site of the great fire of 1872.

Apprentices' Wages.—Dr. Abdy, judge of the Essex County Courts, has given a written decision in a test-case of some importance. Messrs. Eddington & Co., a firm of engineers at Chelmsford, were sued by one of their apprentices for wages which they had deducted on account of their establishment working short time, through the depression in trade. The judge decided that the defendants had no right to deduct wages when apprentices are put on short time, and he therefore directed the verdict to be entered for the plaintiff, with costs.

Royal Academy.—The Exhibition of Old Masters and deceased British Artists will open on the 5th inst. The private view is fixed for this, Saturday, the 3rd inst.——Mr. J. E. Hodgson and Mr. H. H. Armstead were, on the 18th ult., elected Academicians.

Works in Contemplation.—Schools, Londesborough-road, Kingston-upon-Hull (Skinner), 5,597*l.*—Side-chapel to St. Austin's Catholic Church, Wakefield (Wrigley), 400*l.*—University College buildings, Bristol. — Chapel, Tenby (Davies), 2,897*l.* — Houses, New Shoreham, Sussex (Burchell), 750*l.*—Erections for stabling for Tram Company, Newcastle-upon-Tyne (Atkinson), 3,344*l.* 14*s.*—Offices, restaurant, &c., Sandhill, Newcastle-upon-Tyne (Reed & Sons), 2,231*l.* odd. — House, stables, &c., Walmer, Kent (Petts), 2,000*l.* odd. — New schools for Richcol Board, Warrington. — Parochial hall, Inchicore, Dublin. — Pavilion, Dawlish.—Hospital, Upton Valley, Torquay, 2,000*l.*—Town-hall, Nenagh, Tipperary.—Villa residence, Retford (G. Ledger), 1,075*l.*—Wesleyan Theological College, Birmingham (Parton), 24,142*l.*—Offices and premises, Darlington-street, Wolverhampton.—Rebuilding No. 27, Bow-lane, E.C. (Toms), 1,529*l.*—Villa, Burgess-hill (Lockyer), 2,728*l.*—Erection of new wards and other alterations to the Union Workhouse, Nantwich, Cheshire (Madely), 1,450*l.*—Construction of reservoirs, Whitehaven (Jardine).—School, Redden's-road, Lambeth, for London School Board (H. Hart), 8,300*l.*—Police-station and two cottages, Leicester (J. A. Sharp & Son), 981*l.*—Stores and offices, Farnham-road, Guildford (Smith & Sons), 1,649*l.* odd.—Alteration to house, &c., North-street, Chichester (Gamblin & Sons), 1,200*l.*—*Labour News.*

The Goldsmiths' Company and Technical Education.—With a view to the encouragement of technical education in the design and execution of works of art in the precious metals, the Goldsmiths' Company resolved early in the present year to give the following annual prizes, viz.: 50*l.* for the best design for some article in gold or silver which, when manufactured, shall exceed 30 ounces in weight; 50*l.* for the best model for some such article; 25*l.* for the best execution and workmanship of some such article; three prizes of 25*l.* each for (1st) the best design, (2nd) the best model, and (3rd) the best execution and workmanship of some article in gold or silver which, when manufactured, shall be less than 30 ounces in weight; and a prize of 25*l.* each for the best specimens of chasing, repoussé work, and engraving. The conditions were that originality should be necessary to obtain either of the prizes for design, and no copy could be the subject of a prize. The prizes have just been awarded by the company as follows:—

Mr. W. Herbert Singer, design for a clock, 50*l.*; Mr. Henry Harvey, model for an altar-dish, 50*l.*; Mr. Joseph Holgate, design for a mirror frame, 25*l.*; Mr. W. Marshall, model for a card-tray, 25*l.*; Mr. T. Edwards, jun., silver tankard, for execution and workmanship, 25*l.*; Mr. A. W. Austin, repoussé work, 25*l.*; Mr. Deere, chasing, 25*l.*; Mr. William Richard Corke, engraving, 25*l.*; Mr. Hugh Stannus, design for two tankards (an extra prize), 10*l.*; Mr. Christopher Smith, a model for a cup (an extra prize), 10*l.*

Alleged Insecurity of Stockton Bridge. The South Stockton Local Board of Health, being unanimously of opinion that the stone bridge between that town and Stockton, and which is the only ordinary road traffic bridge that connects Cleveland with South Durham, is insecure, recently resolved to communicate with Mr. Stead, C.E., the North Riding Bridge Master, on the subject, and that gentleman and the members of the Board had a conference at South Stockton a few days ago. The bridge was visited and inspected, and at the close of the inspection Mr. Stead said he considered the bridge quite safe, and he could not entertain any question as to its reconstruction or alteration on the ground of insecurity, so far as the authorities of the North Riding were concerned. The bridge is more than a century old.

A New Bridge is now being built by the Corporation of York over the Ouse at Skeldergate Ferry, forming the fourth bridge which spans the river in the heart of the city. The bridge is in close proximity to the Cattle Market, and the piers and abutments are being built of stone taken from the old gaol. The arches will be of iron. It will have a centre arch of 90 ft. span, and one on either side of 80 ft. span, with a land arch on each side of the river of 24 ft. in width. The bridge is being erected under the superintendence of Mr. George Styan, the City surveyor.

Berks Archæological and Architectural Society.—On the 18th ult. the second meeting of this society for the present session was held in Reading, when Mr. W. L. Nash, hon. sec., read a paper on "Numismatics as an Aid to the Student of History."

Heroism in a Sewer.—At a meeting on the 24th ult. of the West Ham Local Board, the surveyor reported that a few days ago, as two of the sewer men were at work cleaning out the sewer at Silvertown, about forty or fifty yards from the man-hole, they were suddenly overpowered by foul gas. One of the men managed to get to the man-hole, and was taken out in an exhausted condition, but the other remained in the sewer, and the crowd accumulated at the man-hole would not venture to his assistance. At length a young man named Spavin, at the risk of his life, went down the man-hole, having a rope fastened around his body, and crawled along the dark sewer, without a light, until he came to the man, who had been overpowered, and whom he found lying on his back, insensible, and almost smothered with the filth of the sewer. He immediately gave the signal to those above, and, seizing hold of the other man, managed to drag him out, and get him safely to the top. The man in question was taken to the Poplar Hospital, and has since recovered, but he would certainly have died had it not been for the heroism of Spavin. It was resolved that the sum of 5*l.* be given to the young man, with a certificate, signed by the chairman, setting forth the reason for the gift.

Robert Raikes.—At a recent meeting of the Metropolitan Board of Works, it was resolved to grant the application of the Sunday-School Union for permission to erect a statue to the memory of Robert Raikes, the founder of Sunday schools, subject to the work of erecting the statue and pedestal being carried out to the satisfaction of the engineer, and subject also to the opinion of the superintending architect with regard to the pedestal. The site suggested is opposite to the first gate in the iron railings eastward of Cleopatra's Needle. The statue will probably be ready to be unveiled on the 3rd of July next. It will be 9 ft. high, cast in bronze, and will have a granite base 11 ft. high.

A Piece of Furniture for the American President.—Some years ago the *Resolute*, an English Government ship, had to be abandoned in the Arctic Seas. It was found by an American Government ship, taken to America, repaired by the Government, and restored to our Government. It was lately condemned to be broken up. Her Majesty having heard of this, ordered that a magnificent article of furniture, combining writing-table, book-shelves, &c., should be made out of the ship's timber, and sent as a present to the President of the United States. Messrs. Morant Boyd & Blanford, Messrs. Jackson & Graham, and, we believe, one other eminent firm, have sent in designs, by request, but the selection has not yet been made.

A Rating Case has just been decided by the Queen's Bench Division of the High Court of Justice of some importance to parochial authorities. The Institution of Civil Engineers claimed to be exempt from the payment of local taxation, on the ground that they were not liable to be rated, as they were relieved by the Act 6 and 7 Vic., cap. 30, as a society for the purposes of "science, literature, and art." Such claim was held not to be tenable, and the Court decided that the Institution was not exempt, and gave judgment on the appeal in favour of the respondent parish.

Builders' Ball.—In our advertising columns will be found an announcement of that which is now known as the "Builders' Ball," held in aid of the Builders' Benevolent Institution. Taking, as we do, a warm interest in its welfare, we are very pleased to see that the hon. secretary, Mr. F. W. Keeble, has been successful in getting together such a number of influential stewards, for we observe the names of some of the most important firms in the building business; and as the success of the ball depends mainly on the exertions of the stewards, this one, we hope, will prove even more profitable than the last.

An "Albert Hall" for Jeypore.—The *Civil and Military Gazette*, published at Lahore, says that Jeypore is soon to be embellished with an "Albert Hall," which the Maharajah resolved to erect in commemoration of the Prince's visit in 1876. The designs have been submitted to his Royal Highness, who has approved of them.

The St. Gothard Tunnel.—The *Gazette de Lausanne* announces that the workmen inside the St. Gothard Tunnel, while working in the northern gallery, can distinctly hear the mining detonations in the southern gallery. The distance which has still to be cut through is 400 mètres.

The City of London Society of Artists has been formed for the purpose of giving periodical exhibitions of pictures in oil and water colours and works of art, and promoting technical education in art in the City. It is proposed to give the proceeds of any exhibition towards advancing the cause of art and artists in the city of London. If the exhibitions are successful, it is proposed to found a self-supporting permanent gallery, where the best instruction will be imparted, and where artists can exhibit and effect the sale of their pictures and sculpture with the guarantee of the committee of the society, and thus bring them into direct communication with the public and purchasers.

The Brush Electric Light.—The Anglo-American Electric Light Company, of Hatton-garden, have just begun introducing the Brush Electric Light into this country. The cheapness of this illuminator seems extraordinary. According to its promoters, the cost is less than half that of any other system. This result is assigned to three chief causes, viz., the smallness of the engine-power required, the use of continuous circuits of single wire, and the cheapness of the carbons. The latter are supplied at 4d. per foot. As for the circuits of single wire, one of them can give sixteen lights, each equal to 2,000 candles. At a public trial on the 23rd ult., the light is reported to have neither flickered nor changed colour. The company seems to "protest too much."

Southampton.—The circus which has been erected in Above Bar-street, for Mr. Thomas Batty, has been opened. The entire building has been erected by Mr. A. Watts, from the designs and plans of Mr. Arthur Martin, architect, within the short period of twenty-six days, and the whole of the interior ornamentation has been carried out by the members of Mr. Batty's staff from London. The dimensions of the circus are 120 ft. by 60 ft., with a height of 36 ft. It is estimated that the circus will accommodate not less than 2,500 persons. Stalls have been provided underneath the gallery for the horses engaged at each performance.

Sunday Opening, Manchester Art Exhibition.—An experiment has been made in connexion with the autumn exhibition of the works of modern artists at the Royal Manchester Institution, which has just come to a close. The council decided some time ago to throw open the doors for gratuitous admission on Sunday afternoons between the hours of two and five o'clock, and the total attendance during the eleven consecutive Sundays on which it has been open,—a period merely of thirty-three hours,—was between 51,000 and 52,000.

Knightsbridge New Barracks.—This large pile of buildings will be ready for occupation early in the new year, and we understand that Mr. James Hill has executed an order for 526 of his improved locks and furniture, together with 200 latches, &c. The keys differ throughout.

Melbourne International Exhibition.—The French Government has intimated its intention of applying for 75,000 ft. of space at this exhibition, which is to open on October 1, 1880.

The Albert Institute, Windsor. — The Prince of Wales will open the new Albert Institute at Windsor on Saturday, January 10.

New Buildings, Parliament Street.—Mr. Henry A. Hunt and Mr. E. T. Hall are joint architects of these buildings.

TENDERS

For fitting up kitchen, &c., at the Asylum for Imbeciles, Darenth, Kent, for the Managers of the Metropolitan Asylum District. Messrs. A. & C. Harston, architects:—

Contract No. 3.

Barford & Perkins	£1,884 15 6
Hassell & Singleton	1,683 0 0
Clements & Co.	1,420 0 0
Gorman & Co.	1,249 0 0
Bradford & Co.	1,240 0 0
Bunnett & Co.	1,182 0 0
F. & G. R. Vigor	1,180 0 0
J. & F. May	1,180 0 0
Benham & Sons (accepted)	950 0 0

Second tendering for joinery fittings at the above-named asylum:—

Lascelles	£1,253 0 0
Niblett	1,166 0 0
Gloucester Wagon Co.	1,149 10 0
Mackey	1,120 0 0
Emery	1,048 0 0
Braid & Co.	1,050 0 0
Gumbrell	1,010 0 0
Avard	990 0 0
Adcock	889 0 0
Webber (accepted)	800 0 0

For seventeen houses, to be built at South Grove, Tunbridge Wells. Mr. M. Lawrence Caley, architect. Quantities supplied by Mr. T. Ladds:—

Strange & Son	£13,021 0 0
Pink	12,740 0 0
Mason	12,703 0 0
Willicombe & Oakley	11,700 0 0
Beale & Son	11,359 0 0
Judd & Young	11,220 0 0
Elwig	10,798 0 0

For the construction of roads and sewers on the St. Ann's Church Estate, Stamford-hill. Messrs. Tunley & Boyle, surveyors:—

Ford	£740 0 0
Jackson	740 0 0
Champion	735 0 0
Harris	730 0 0
Pizsey	716 7 10
Bath & Blackmore (accepted)	631 0 0

For alterations to No. 1, St. James's-street and corner of Pall Mall. Mr. R. Hesketh, architect:—

Rider	£1,068 0 0
McLachlan & Sons	994 0 0

For the erection of Wesleyan schools on the American system, Tottenham. Mr. Charles Bell, architect:—

Humphries (accepted)	£2,500 0 0

For the erection of two houses in the Stradbroke-road, Hendon. Mr. J. H. Taylor, architect:—

Painter (accepted)	£695 0 0

For the erection of two houses in the Victor-road, Willesden Junction. Mr. J. H. Taylor, architect:—

Painter (accepted)	£645 0 0

For the erection of three houses in Lancefield-street, Harrow-road. Mr. J. H. Taylor, architect:—

Rudkin	£1,300 0 0
Painter	1,220 0 0
Vears	1,125 0 0
Martin	1,046 10 0
Boyer (accepted)	1,040 0 0

For works, No. 2, King's-road, Chelsea, for Mr. Peter Jones. Messrs. Perry & Reed, architects. Quantities supplied:—

Contract No. 2.

Browne & Robinson	£4,037 0 0
Clarke & Bracey	3,881 0 0
Clemence	3,645 0 0
Richardson	3,415 0 0

For new roads and sewers, Whittington-road, Bowes Manor Estate, Wood-green, for Mr. G. Searle:—

R. Taylor	£1,200 0 0
Toller & Hamblin	877 0 0
C. Taylor	824 0 0
Nicholls (accepted)	802 4 6

For the enlargement and alterations to the Servite Monastery, in the Fulham-road. Messrs. Joseph A. Hansom & Son, architects:—

Braid & Co.	£3,475 0 0
Castle	2,394 0 0
Scott	2,195 0 0
Sutton	1,945 0 0
Carmody	1,800 0 0
Wilkins	1,580 0 0
R. & E. Smith	1,558 0 0
O'Keeffe	1,495 0 0

For alterations at the Rose and Crown, Goswell-road, for Mr. Brunsden. Mr. H. J. Newton, architect:—

Grimwood	£488 0 0
Taylor	477 0 0
Godden	472 0 0
Marr	399 0 0
Lamble (accepted)	383 0 0
New Counter.	
Edwards	129 15 0
Heath	97 0 0
Hellings	95 10 0
Warne (accepted)	91 10 0

For building seven shops and dwelling-houses at Earl's-court, for Mr. A. Savigear. Mr. F. Edwards, architect:—

Martin, Wells, & Co. (accepted)	£8,984 15 0

For building six villa residences at Higham-hill, Walthamstow, for Mr. Higham. Mr. W. H. Longmore, architect:—

Reed & Son	£6,100 0 0
Hunt	5,016 0 0
Watson & Dennett	4,462 0 0
Reed	4,300 0 0
Larter & Son	4,300 0 0
Howard	4,085 0 0
Jackson & Todd	2,999 0 0

For additional kennels at the Home for Lost Dogs. Mr. Edward Clark, architect:—

Nayte	£691 0 0
Mitchell & Co.	649 0 0
Smith	627 0 0
Adcock	626 0 0
Eary (accepted)	618 0 0

For alterations and decorative works at the London Assurance Tavern, for Mr. J. C. Ring. Mr. Edward Clark, architect:—

Sabey (lowest)	£159 10 0

For repairs, Spring Vale Laundry. Mr. C. Spencer Rolfe, C.E. Quantities by Mr. Edward Clark:—

Nayte (accepted)	£598 0 0

For additions to the Hall-by-the-Sea, Margate, for Mr. George Sanger. Mr. Edward Clark, architect. Quantities supplied:—

Adcock (lowest)	£3,798 0 0

For alterations and additions at Ford Manor, Surrey, for Mr. J. Spender Clay. Mr. Robert Kerr, architect. Quantities by Mr. Walter Barnett:—

Howard Bros.*	£1,973 0 0

* Credit for Materials, £530.

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H.—H. L.—J. H.—Y.—D. W.—W. S.—L. C.—H. W. P.—F. J. D.—W. H. C.—W., McK.—H. J. N.—H. H.—C. F. M.—E. R.—M. R. & Co.—R. P. S.—H. J.—T. C. S.—C. E. S.—W. L. S.—C. H.—J. & W.—Messrs. H.—M. W. & Co.—C. S.—E. C.—B. (the question has been discussed in previous numbers of the *Builder*. Sound cannot be intercepted by the mere interposition of a "material").—Inquirer (the charge for taking out quantities depends to some extent on the amount of the work, and ranges between 1½ and 2½ per cent.).—Music (we have already expressed our opinion on the subject).—A. B. (next week).—T. C. C. (next week).—J. R. (next week).—T. R. S (next week).—W. O. C. (next week).

All statements of facts, lists of tenders, &c, must be accompanied by the name and address of the sender, not necessarily for publication.

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